Capturing the psychological well-being of Chinese workers and understanding its relationship with factory performance

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This thesis is submitted for the degree of Doctor of Philosophy.

Declaration

This thesis is the result of my own work and includes nothing which is the outcome of work done in collaboration except as declared in the Preface below or specified in the text.

It is not substantially the same as any that I have submitted, or any being concurrently submitted, for a degree, diploma or other qualification at the University of Cambridge or at any other university or similar institution, except as declared in the Preface or specified in the text. I further state that no substantial part of my thesis has already been submitted, or is being concurrently submitted, for any such degree, diploma or other qualification at the University of Cambridge or any other university or similar institution except as declared in the Preface or specified in the text.

It does not exceed the prescribed word limit for the Degree Committee in Engineering.

Abstract

**Capturing the psychological well-being of Chinese workers
and understanding its relationship with factory performance**

by Minette Bellingan,

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December 2021.

Media reports of workers losing their lives in factory disasters indicate the failure of audit-based regimes to protect even physical well-being in global supply chains, while distress has been seen to lead to workers' suicides, yet there is neither clear guidance nor even consensus on how factories should be monitored to facilitate the urgently needed change. Workers themselves are excluded from the social sustainability debate. The lack of knowledge about what impacts Chinese factory workers' well-being led to a first research question: *What are the factors that influence well-being for Chinese factory workers?*

To persuade stakeholders of the value of making changes, evidence of how that may affect factory performance was also sought. A link would provide an extra incentive for businesses to prioritise these workers' well-being. This led to the formulation of a second research question: *How does workers' well-being influence factory performance?*

Going to the heart of the matter by asking the workers, fieldwork set out to discover what life is really like for workers in these factories. A novel research method using workers' daily digital diaries was developed. A brief pilot in 2017 was followed by a 12-month study across four factories in 2019. Potential well-being interventions were also designed and tested in an operating factory environment to produce the empirical data required.

The fieldwork identified three interdependent aggregate dimensions impacting these workers' well-being: 1) social displacement, struggles with factory life and the trade-offs with long-term life goals; 2) frustration and demotivation due to operational problems and 3) work relationships impacting self-worth. Operational problems causing loss of remuneration were understood to impact workers' life goals, which in turn undermined working relationships. The first research question was answered: Workers' inability to influence operational issues led them to lose all hope of achieving their longer-term goals, damaging their eudaimonic and social well-being in the factories.

This suggested two training interventions to address some identified operational and interpersonal problems in the work environment. Comparing pre- and post-intervention data indicated that these interventions had influenced both well-being and performance. Most significantly, post-intervention diaries indicated a reduction in negative sentiment. Factory-level metrics, supplied by factory management, indicated that the training had improved factory performance. Worker attrition also appeared significantly reduced after training. The second research question was answered: There were indications that interventions had positively impacted both workers' sentiment and some aspects of factory performance.

This work achieves transparency for the first time into the concerns of workers in Chinese factories, indicating that eudaimonic factors impact their well-being more than the hedonic factors now typically monitored. Unlike most Sustainable Supply Chain Management (SSCM) literature, which focuses on physical conditions, it highlights workers' complex relationships with colleagues and line leaders. This brings empirical evidence and detail to a discussion long overdue, creating a basis for further theory development in supply-chain social sustainability, specifically around workers and impacts on their well-being. It also contributes to the Psychological Capital (PsyCap) literature, which had mainly focused on western workplaces and relied on surveys, by allowing for a more reliable well-being assessment. By measuring these workers' well-being longitudinally over an extended period it allowed the researcher to infer causality, while using the factory's performance metrics avoided data-integrity issues.

This novel research connects SSCM with workplace well-being theory. It advances the knowledge with both an understanding of the well-being of workers in Chinese factories, hitherto missing from SSCM literature, and a more nuanced approach to the theory on workers' well-being. It changes how these factories and their workers are seen by presenting the picture from a new and more relevant perspective.

'Chinese workers are not forced into factories because of our insatiable desire for iPods. They choose to leave their homes in order to earn money, to learn new skills, and to see the world.'

Leslie T. Chang

'The voices of China's workers', TED Talk, www.ted.com, June 2012

Preface

This thesis mentions the support of an NGO, training provision, and the creation of a chat bot and data analysis system. For the avoidance of doubt, much of this work was done by the researcher, and any other contributions, including those of the NGO, were voluntary and unpaid. In 2020 I published a paper in the IJOPM based on an early part of the research for this thesis. That research was all my own work. There is therefore potentially some repetition from that paper in this thesis, some literature is referenced and example diaries shared in both, and sections of the method and findings are similar. The IJOPM article was produced with collaborators who added guidance to the paper but did not contribute to the research work itself.

Acknowledgements

This thesis refers to myself as *the researcher* throughout. However, there are many people without whom it would never have been either started or finished. I would particularly like to thank my supervisor Dr. Mukesh Kumar and advisor Prof. Steve Evans. I would also like to thank Dr. Catherine Tilley who has supported me for so many years and collaborated with me in publishing work which is referenced throughout this thesis. She is an inspiration and a wonderful friend who has helped me greatly. I am grateful beyond words for her encouragement and commitment.

This thesis would not have been possible without the factories in China and the workers who work in them every day. I cannot mention names for reasons of confidentiality but over the research period many workers became well known to me. They and their factories have remained in my thoughts daily. Working in factories is difficult and the workers face many challenges, but it also provides opportunities and freedom without which their lives would be even harder. I want to thank the factory owners and managers for their continued support of the research throughout.

I want to thank Hope for her support in proofreading my work, and Nicole, Joe and Kurt, my friends in China who supported me throughout my research and helped me to remain committed to its completion.

Finally, I would like to acknowledge my father, who was not with me on this journey, for giving me my work ethic and the courage to lead my life with resilience. His memory has been a blessing.

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Abbreviations

APA	American Psychological Association
BSCI	Business and Social Compliance Initiative
CNBC	Consumer News and Business Channel
CNY	Chinese New Year
CoC	Code of Conduct
CSR	Corporate Social Responsibility
EICC	Electronic Industry Citizenship Coalition
FLA	Fair Labour Association
GRI	Global Reporting Initiative
HRM	Human Resource Management
ICTI	International Council of Toy Industries
ILO	International Labour Organization
ISO	International Organization for Standardization
NGO	Non-governmental organisation
NLTK	Natural Language Toolkit
POB	Positive Organisational Behaviour
POS	Perceived Organisational Support
PsyCap	Psychological Capital
RBA	Responsible Business Alliance
SAI	Social Accountability International
SCM	Supply Chain Management
SMETA	Sedex Members' Ethical Trade Audit
SSCM	Sustainable Supply Chain Management
UNGC	United Nations Global Contract
WHO	World Health Organization
WRAP	Worldwide Responsible Accredited Production

Chapter 1. Introduction

1.1. Context

The world's largest exporter since 2009, China has long been known as the world's factory. Faced with an ongoing expectation of ever-lower retail prices, global businesses rely heavily on China's low-cost manufacturing base. China has meanwhile surpassed the United States in terms of purchasing power, and its factories are now also producing for domestic consumption. With demand surging, the country's factories continue to require reliable, affordable labour.

Factory work can be seen as an aspect of the movement of China toward globalisation and modernisation. More than 200 million internal migrants have become a new urban working class in China (Ngai and Lu, 2010; Grayson and Nelson, 2013; Kim, 2015; Siu, 2015; Yang and He, 2017). Since 2013-14, factory jobs have been readily available (Siu, 2017). Competition between Chinese factories to attract and retain workers is increasing, especially in dense manufacturing areas such as Shenzen and Guangzhou. A shortage of the skilled labour which was formerly a source of competitive advantage for China, particularly in the electronics industry, is expected to be one of the greatest barriers to the country's continued growth (Ferdows, 1997; Ma and Trigo, 2008; Hartmann *et al*., 2010; Koo, 2016; Yang and He, 2017). The Chinese Ministry of Human Resources and Social Security said at the start of 2021 that manufacturing-related positions accounted for 36 of the 100 roles in China facing the greatest labour shortages (Cheng, 2021). Factories will not be able to afford the high staff turnover they experienced in the 1990s. Competition has increased wages, which have almost tripled since the early 1990s (Chu and Hail, 2014; Kim, 2015; Xiaojun, 2017; Siu, 2017). The contemporary Chinese worker is aware of the value of his or her labour and willing to repeatedly switch jobs (Ngai and Lu, 2010; Xiaojun, 2017; Zhang and Frenkel, 2018).

The Chinese workforce has begun to age and shrink. While people who were previously migrant workers can now afford to stay closer to their families, young adults reject factory jobs in favour of pursuing education. Shirley Zhou, IT director at Midea, a large manufacturing facility in southern China, told CNBC: 'Young people today aren't willing to work on factory floors' (Cheng, 2021). Recently, some potential migrant workers are also reportedly worried about catching Covid-19 in cities or factories, or about being trapped in factory lockdowns to prevent the spread of the disease. Factories making everything from toys, clothing or everyday consumables to some of the world's most famous consumer

electronics report struggles to keep production roles filled. The labour shortages across the country may foreshadow larger challenges ahead.

While both media and academic literature suggest that China's factories urgently need to improve their worker retention, they also show that businesses know little about the well-being of the factory workers in their global supply chains. With the complexities of globalised production, transparency is lost. As defined by Goleman (2009), transparency, in economic theory, means a business providing key information to help its stakeholders to make decisions. This, in turn, gives that business an incentive to align their practices with their consumers' priorities (Goleman, 2009). Under increasing pressure to ensure social sustainability in their suppliers' factories, these businesses have turned to audits. A proliferation of monitoring schemes and third-party or in-house auditing regimes has arisen from this self-motivated self-regulation, generating multiple audits for factories and creating a *culture of compliance* as stressed suppliers tend to focus on their clients' expectations (Tsui *et al.*, 1997; Adler *et al.*, 2017). Subject to bias and internal inconsistency, this conventional approach to monitoring can fail to provide sufficient data to adequately protect workers (Short *et al.*, 2014). Furthermore, while there has been considerable research in the last two decades considering social risk management in global supply chains, rather less has considered the factory workers and what may impact their psychological well-being.

Academics have been studying well-being at work for nearly a century, but primarily in western workplaces and from a western perspective (Fisher, 2014). Studies have shown that well-being matters for everyone involved in manufacturing: workers' lives could be improved, factories could be more productive, and the reputational damage done to client businesses by poor factory working conditions could be reduced (Avey *et al.*, 2010a; Avey *et al.*, 2010b; Luthans *et al.*, 2010; Luthans *et al.*, 2013; Locke, 2013). China's factory workers are a potential source of competitive advantage for both factory and client, yet little is gleaned through factory audits about the factors influencing their well-being.

1.2. The problem

According to Tov and Chan (2012), the well-being of workers affects both productivity and internal working relationships. It is recognised that there is a need for change in global supply chains, and that understanding and nurturing the well-being of workers is an important constituent of the required transformation.

However, little is known about the well-being of Chinese factory workers in a holistic sense. While, without the appropriate theoretical and methodological frameworks, well-being is

intangible and can be difficult to capture, there is a lack of consensus on both what to measure to ensure it and how that measurement might be achieved. Psychological well-being and happiness are at times used as interchangeable terms (Bradburn, 1969). In this thesis *well-being* refers to a person's overall psychological condition, which has broad cognitive, emotional, physical and behavioural facets. It also remains unclear whether its workers' well-being actually influences the performance of a Chinese factory. Identifying a link would create the incentive for both buying and supplier businesses to ensure that improving the well-being of these workers is prioritised.

1.3. The reasons for this research

This research was warranted for two main reasons. First, media reports of workers losing their lives in factory disasters indicate the failure of audit-based regimes to reliably protect even physical well-being, while distress has been seen to lead to workers' suicides, yet there is neither clear guidance nor even consensus on how factories should be monitored to facilitate the urgently needed change (Vasi and King, 2012). Second, the workers themselves are generally missing as stakeholders from the debate on social sustainability in their factories. There is a lack of empirical knowledge about what impacts their well-being. Therefore, finding out what the situation is really like for workers in these factories and how it impacts their well-being is important work. If a link could also be established with improved factory performance this would incentivise businesses to prioritise the well-being of workers.

This researcher's interest in the social sustainability of manufacturing had developed over 20 years spent working in the sector. Initially her focus was OEM and ODM product sourcing from Asian and African factories, which involved managing thousands of suppliers in terms of operations, quality and compliance for a business selling products across all categories in 24 countries. Over time, the focus of her involvement would shift to include social sustainability and responsible sourcing practices, which led her to work more closely with their factories and the workers on the production lines. In Asia and North Africa the challenges to sustainability in global supply chains are considerable, and having worked with factories with multiple sites and close to a million employees during their peak production periods, it became apparent to her that neither academics nor practitioners were addressing the challenges to ensuring workers' well-being in factories. Continued pressure on retailers and brands for speed and lower costs was only aggravating the pressures on their supply chains and those working within them. Audits did not appear to be improving or evolving to meet the needs of those most impacted by their social conditions.

The problem suggested several possible fields of inquiry, so an extensive literature review was conducted before finalising the research questions. The research adopted an evidence-based approach to ensure the results met the needs of both academics and practitioners and that the time spent by the researcher in the field did not bias the findings (Lund *et al.*, 2021).

1.4. Thesis structure

The thesis is organised to broadly reflect the order in which the various parts of the research were conducted. Progressing from an initial objective – to understand more about the well-being of Chinese factory workers – to the development of two research questions rooted in the current literature, it then set out to answer those questions using two longitudinal field studies. The document begins with the development of the research questions then describes the method used, its evolution into a substantial study following an initial pilot and the findings from both. It then discusses those findings in more detail and considers how they relate to the current research, some limitations of the work and the implications of the findings for industry and for future research.

The main content is organised as follows:

The Research Questions: Chapter 2 describes a review of the existing literature, identifying the problems which led to the definition of two research questions.

Methods: Chapter 3 outlines the research, which consisted of two connected longitudinal field studies, its underlying philosophy and the overarching structure of the research. Challenges created by the research environment had revealed the need for an innovative research tool, the design of which is also described.

Findings: Chapter 4 presents the findings of the two longitudinal field studies. It considers initial insights from the pilot data then discusses detailed findings from the main study. The combined findings are used to create a theoretical model for supporting the well-being of workers.

Discussion: In Chapter 5 these findings are considered in the context of current knowledge.

Contribution and conclusions: Chapter 6 assesses the limitations of the work, its contribution to knowledge and its implications for practice.

Chapter 2. Developing the research questions

2.1. The approach to reviewing the literature

This chapter documents a two-stage examination of the current academic literature concerning social sustainability in global supply chains and what is known about the well-being of those most affected, the workers. Stage one was wholly systematic and prompted stage two, which adopted a more thematic approach.

The review first set out to consider published descriptions of attempts to find ways to improve transparency into labour conditions in global supply chain factories. A systematic stage gathered an overview of the literature on social risk in Chinese factories and how it is managed. This led into a second stage adopting a broader, more thematic approach with a view to specifically understanding the workers, particularly in China, and what might actually impact their well-being. Problems emerging from this combined literature formed the basis of two research questions. This chapter therefore describes that initial, systematic review, the more worker-focused thematic review considering factory workers in China and the broader workplace well-being theory, and the insights gained from the overall exercise.

2.2. Mapping the literature – a two-stage review

A review informed by the principles of systematic review was first undertaken to delineate the existing literature, identifying areas of agreement or disagreement and, particularly, problems (Tranfield *et al.*, 2003). This required a wide search. A systematic approach can consolidate and synthesise the arguments in a fragmented, potentially contradictory body of literature. According to Tranfield and Denyer (2003; 2006) a literature review should also allow for the development of new research questions. The aim was to gain an overview of the relevant theoretical, practical and methodological debates, rather than to work from assumptions driven by a hypothesis. The review also sought to identify any problems evident from the literature, using these to formulate new research questions and to build an investigation.

The initial systematic review comprised three steps. The first was to search available databases, both academic and in the public domain, (i.e. JSTORE, SCOPUS, INFORMS, Wiley, Thomson Reuters Web of Science, Google Scholar, etc.) for materials published in English before the end of 2019 (this would then be continually updated throughout 2020 and 2021), using the following combinations of keywords: *social risk management in factories*; *social risk management in supply chains*; *labour standards in factories*; *ethical treatment of workers in factories*; *corporate social responsibility in supply chain management*; *factory*

workers labour standards; *factory workers stories*; *factory workers lives*; *social self-regulation in factories* and *factory audits*; and *factory inspections* and *factory auditors*. '*' was included to yield as many papers as possible. Free keyword searches using different combinations of the above were also conducted. This produced a list of 688 articles, including journal articles, book chapters and conference papers.

In the second step, the titles and abstracts of these articles were reviewed to remove those:

- Not focused on factories in global supply chains
- Not including any focus on the workers in factories
- Focused on corporate social responsibility outside of manufacturing
- Focused on very specific situations related to corporate social responsibility
- Focused on corporate social sustainability reporting and management
- Focused very specifically on reputational risk management by businesses and not including social risk management
- Focused on environmental and economic factors in supply chains and where social aspects were limited or excluded
- Focused on industries not related to factories, such as mining or farming.

This filtering selected 486 articles for review. The third step was to read and categorise these articles. Because of the broad nature of the enquiry, the relevant articles found were very diverse, and widely dispersed across journals, conference proceedings, books and other sources. They were therefore considered thematically. The journals yielding more than three relevant articles were generally oriented toward Supply Chain Management (SCM) or operational concerns. Of the larger number producing fewer relevant articles, journals concerned with people management, industrial relations and sociology were well represented.

The supply chain and social risk management literature raised three main problems: a lack of consensus on how (and indeed why) social risk should be managed and measured, questions around what should be measured and issues with who does the measuring. There was little connecting these with the concerns about factory workers and their well-being seen elsewhere. Despite a large body of literature discussing Sustainable Supply Chain Management (SSCM), little of it suggested methods to assess the well-being of workers, and no consensus was found on a framework to measure or improve that. It was felt that the systematic review primarily indicated that the well-being of Chinese factory workers is currently neglected in the SSCM literature, and more likely to be discussed in terms of industrial relations or in a more sociological context. A notable exception was the significant

group of articles discussing Lean production theory, which often mentioned workers and sometimes the potential impacts on their well-being of Lean approaches. Two helpful studies actually measuring the well-being of workers in Chinese factories were also uncovered at this stage (Luthans *et al.*, 2005; Luthans *et al.*, 2008). These considered the state of an individual in terms of Psychological Capital (PsyCap).

A second, thematic, review stage, employing a *snowballing* approach where appropriate, was launched to further explore the lives, experiences, attitudes and behaviour of Chinese factory workers, and to consider the theory and research on workplace well-being. The objective was to attempt to link findings back to SSCM, with a view to developing an implementable solution accessible to SCM practitioners. The theory on PsyCap, a combination of Positive Organisational Behaviours (POBs), was identified as important to this research as it had motivated some of the very limited well-being literature specifically considering Chinese factory workers. Snowballing from the two Luthans-led PsyCap papers (i.e. Luthans *et al.*, 2005 and Luthans *et al.*, 2008) led to further positive organisational literature – on POBs and on both psychological and social capital – and to some on Human Resource Management (HRM). This expanded the database by 338 papers to an overall total of 824 articles. These were again widely distributed, with 671 articles found across 339 journals and the remainder in books, conference papers, news outlets or similar sources.

Table 1: Themes of articles found across 339 journals

Journal article theme	Total articles found
SCM / CSR / Audits	223
Well-being / Health / Occupational health and safety	110
HRM / People management	101
Lean approaches and theory	60
PsyCap	59
Industrial Relations / Workers' Voice	29
Sociology	26
Training	21
Positive psychology	14
Organisational behaviour	13
Practical organisation	9
Grand Total	**671**

Figure 1, below gives an overview of the full literature review process and its different steps.

Figure 1: Literature review process overview

SYSTEMATIC
REVIEW

Step 1: Publications keyword search
Keyword searches* on all academic and public databases for materials published in
English on **supply chain and factory social risk management**

688 *articles*

Step 2: Abstract review to improve sample focus
Based on abstracts, articles were removed to focus the research on **global supply chain**
factories, social aspects *and* **factory workers***, leaving*

486 *articles*

Step 3: Read 486 articles, identifying themes
revealing a focus in SSCM on buyers' supplier relations and reputation management
Workers and their well-being were neglected as a subject

NARRATIVE
REVIEW

Step 4: Thematic snowballing
from the bibliographies of interesting or useful papers touching on **well-being, workers,**
and relevant **metric systems** *and* **research approaches**

Adding 338 *articles to produce* **824**

Step 5: Read further 338 articles and categorise 824 by theme
suggesting the potential of areas such as
HRM, PsyCap, diaries, well-being theory, lean approaches, training

Step 6: *informed by the literature*
Define the research questions
Develop hypotheses for testing
Design the field research and potential interventions

To ensure newly published literature was included in the ongoing research the literature was updated during the data analysis stages of both pilot and main study, by searching for, reviewing and including any relevant new literature. A thematic breakdown of the overall total of 339 journals containing relevant articles is shown below.

Table 2: Journals found by journal theme

Journals with relevant articles by journal's main theme	No. of Journals
Psychology	44
Organisation management / Leadership	43
Sociology	25
Operations management	24
Business	22
HRM / People management / Organisational behaviour	17
Occupational health and safety / Ergonomics	15
Marketing	15
Sustainability / Ethics	15
Psychiatry / Medicine	14
Industrial Relations	14
Policy / Governance / Law	13
Supply chain management	12
China- or Asia-focused titles	10
Economics	10
Public health	10
Technology	10
Education	8
Development	8
Metrics	8
Philosophy	2
Total journals	**339**

The most significant article subject group to emerge from the initial, systematic review covered supplier relations in terms of Corporate Social Responsibility (CSR), SCM or auditing. These were strikingly oriented toward social risk management from the perspective of a western buying business. They concerned self-regulation against CSR policies, supplier-buyer relationships and some CSR benchmarking schemes, audit regimes and enforcement mechanisms. A significant minority were concerned with improving the measurements themselves, while the remainder focused on supplier management with an implicit bias toward reputation management. A further small proportion were directly concerned with the *stakeholders* of the buying business – typically defined as consumers, consumer non-governmental organisations (NGOs), shareholders and employees – their concerns, and how to manage their perceptions.

Just seven journals across the combined review were found to include more than ten relevant articles. The Journal of Business Ethics stood out as having published 30 relevant articles, of which 22 were focused on SCM concerns. The other six titles, ranged across SCM, management and sustainability concerns, each contained between 13 and 18 articles. Lean approaches stood out from this group as an article theme – six articles discussing Lean were found in the International Journal of Production Management and a further six in the Journal of Cleaner Production. Lean literature emerging from the systematic review highlighted Lean theory for its unusual concern with the contributions of, and impacts on, individuals. Relevant Lean themes in the final sample would include HRM, training, job complexity and teams.

Most of the 59 articles found which specifically focused on PsyCap had emerged from the thematic review. These were more widely distributed across journals on psychology, management, medicine and business generally. None of these titles contained more than two relevant articles. Notably, beyond the two papers already mentioned and one further example using PsyCap as a measuring system (i.e. Seo and Chung, 2019) the otherwise broad field of positive psychology did not appear to consider Chinese factory workers.

The theoretical literature on workplace well-being examined largely concerned western organisations, and primarily those in the USA. Useful subjects to emerge from the well-being theory were the use of diaries in sociological research and the potential of digital communication methods. While a primary concern for many of the workplace well-being studies was work performance, more specific well-being issues such as stress, dignity, relationships and work-life balance were also discussed.

Table 3: Journals with more than three relevant articles, by article subject

Journal title	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
Journal of Business Ethics	30	22	1	6	1									
International Journal of Operations and Production Management	18	8	2	1	6		1							
Journal of Cleaner Production	17	10			6				1					
International Journal of Human Resource Management	13			5		2	4		2					
International Journal of Production Economics	13	9		1	3									
Journal of Management	13		1	6		4					1	1		
Journal of Organizational Behavior	13		4	3		3					2	1		
Journal of Applied Psychology	9		2	6	1									
International Journal of Physical Distribution and Logistics Management	8	8												
International Journal of Production Research	8	3		1	3	1								
Journal of Happiness Studies	8		7			1								
Leadership Quarterly	8			8										
Supply Chain Management	8	8												
Sustainability	8	7		1										
Academy of Management Review	7	4		2								1		
Industrial and Labor Relations Review	7	1	1	1	1		2					1		
Journal of Personality and Social Psychology	7		2			3				1			1	
Journal of Supply Chain Management	7	7												
Academy of Management Journal	6		2	2							2			
Administrative Science Quarterly	6	1	1	2		1			1					
Social Indicators Research	6		4					1		1				
Strategic Management Journal	6	1	1	3								1		
Modern China	5						2	3						
Personnel Review	5	1	2	1					1					
World Development	5	3						2						
British Journal of Industrial Relations	4	1		1			2							
Corporate Social Responsibility and Environmental Management	4	4												
Human Resource Development Quarterly	4					4								
Human Resource Management	4	1		2			1							
Journal of Manufacturing Technology Management	4	1	1		2									
Journal of Occupational and Organizational Psychology	4		1	1		1							1	
Journal of Occupational Health Psychology	4		1		2	1								
Journal of Positive Psychology	4		4											
Politics and Society	4	3		1										
Personnel Psychology	4			2		2								
Psychological Bulletin	4		2			1						1		

Table 4: Themes of journals with fewer than four relevant articles, by article subject

Journal theme	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
Management	**51**	9	5	8	8	10	1	1		1	4	4		
Psychology	**42**		14	8	1	8	1			6	2	1	1	
Operational management	**30**	18	1	2	9									
Business	**29**	17	1	6	1	3			1					
Sociology	**25**	6	3		3	3	7	2			1			
HRM / Organisational behaviour	**19**	2	3	6		4		1	1	1	1			
Occupational health and safety / Ergonomics	**19**	2	9		3				5					
Policy / Governance / Law	**17**	15	1					1						
Marketing	**16**	13				2					1			
Psychiatry / Medicine	**16**		6			5			4					1
Sustainability / Ethics	**15**	13	1	1										
Economics	**15**	5	4	4	1				1					
Industrial Relations	**14**	2	3	4		1	1	3						
Asia- or China-focused general titles	**13**	1	1				5	6						
Technology	**13**	3	3	2	3		1		1					
Public health	**12**		9	1				1	1					
Metrics	**11**	5	2	1		1								2
Development	**10**	4	2				2	2						
Education	**10**		1	2	5				2					
Supply Chain Management	**7**	5			1							1		
Philosophy	**2**		2											

Table 5: Relevant articles found outside journals

Publication Type	
Thesis, conference paper, etc.	39
News, press release, briefing, etc. (e.g. CNBC, KPMG)	25
Book (Sage, Wiley, University of Cambridge, MIT, etc.)	89

The full bibliometrics from the two stage literature review are shown in Appendix 1.

The next part of this chapter covers more detailed insights from this two-stage review, first describing why and how businesses attempt to achieve transparency and manage social risk in their supply chains, the problems these attempts encounter and the inconsistencies generated.

2.3. Insights from the literature review

2.3.1. Attempts to manage social risk in global supply chains

Manufacturing in developing countries continues to gain importance as pressure grows on businesses for lower costs and frequent new product lines (Maloni and Brown, 2006; Whitehouse, 2006; Jamali, 2007; Matten and Moon, 2008). The SCM literature in particular confirmed that more and more western businesses are moving production to China, generating complex global supply chains. Large retailers now compete fiercely on price and selection while internet players have the advantage of low infrastructure costs. Consumer expectations of increasingly diverse product ranges at ever lower prices, as particularly seen in the *fast fashion* industry, lead businesses to outsource production to countries with low labour-costs (Surowiecki, 2013; Caminal, 2016). Cost-reduction strategies, aggressive lead-time reductions and last-minute order placements can then place an unsustainable burden on their suppliers' factories.

Unsustainable business practices among their suppliers create social risk for which the buying business is potentially liable (Johansen and Nielsen, 2011; Canzaniello *et al.*, 2017). Media reports revealing poor working conditions and distressed workers are potentially the greatest risk facing a business in this age of social media. CSR is now a priority for all business leaders, many of whom first recognised social risk only as the result of public responses to issues they had not previously considered their responsibility (Porter and Kramer, 2006). Global businesses have been harshly criticised for *sweatshop* conditions deep in their supply chains (Perry and Towers, 2013). Nike, for example, faced an extensive consumer boycott in the 1990s after the New York Times reported abusive labour practices in Indonesian factories sub-contracted by its suppliers (Brown, 2013). Levi's and the Gap were among those receiving similar surprises (Sum and Ngai, 2005). Transparency therefore became central to the debate (McWilliams and Siegel, 2001; Friedman, 2007; Egels-Zandén, 2014). To manage social risk, businesses began to institute measures to protect labour rights as well as basic human rights in their supply chains (Egels-Zandén, 2014). Iconic brands like Nike, Mattel and Gap formed CSR teams and worked with contractors to create a new system of factory audits and inspections, initiatives which have won praise from some quarters for improving working conditions, particularly in terms of basic workplace health and safety (Sum and Ngai, 2005).

This self-regulation through audits evolved into a self-governing mechanism which has been used to strengthen norms of accountability. It may be used to legitimise business practices in globally-dispersed supply chains (LeBaron and Lister, 2015). Risk nevertheless remains

where a business monitors itself against its own code without external accountability. Many businesses have already done a great deal to improve the social impacts of their activities in global supply chains, but academics and industry practitioners agree that the cost-reduction strategies of many of the world's larger businesses continue to cause poor working conditions in supply chains, especially in developing, low-wage countries (Gimenez and Tachizawa, 2012; Walker and Jones, 2012; Köksal *et al.*, 2017).

SSCM, as distinct from SCM, considers the strategy and culture of risk management and transparency (Carter and Rogers, 2008; Köksal *et al.*, 2017). It allows for non-economic considerations to be weighed as part of a business leader's decision-making, incentivising social and environmental sustainability alongside profits (Hakemulder, 2015; Roy *et al.*, 2018). The concept of SSCM is still fluid and evolving. While much SSCM literature exists as a call to action the outcomes of this approach can be complex to measure and detailed data is sparse (Carter and Rogers, 2008; Seuring and Muller, 2008). Most SSCM studies containing analytical data are focused on environmental rather than social sustainability (Golicic and Smith, 2013; Geng *et al.*, 2017).

The SSCM literature did, however, start to outline the web of relationships in diversified supply chains, with factories being the first actor in a chain, monitored by what Köksal and Strähle (2017) term the 'main company' (the buying business), the second actor. In conventional SCM, the relationship between supplier and main buyer is treated as the priority (Seuring, 2013). Köksal and Strähle's (2017) model incorporates the understanding that SSCM is driven by the main buying business to appease its stakeholders, a very important third actor, and indicates that relationships between all three actors should be considered to achieve social sustainability (Seuring, 2013).

2.3.2. Stakeholder pressure and attempts to legitimise business choices

Historically, pressure on businesses to find out what is happening in factories has come primarily from western consumers. Social media has made businesses more exposed. Although stakeholders can create unproductive tension when they require both ethical behaviour in supply chains and faster, cheaper production, internal stakeholders (i.e. employees) can push for proactive sustainability programmes and external stakeholders – like consumers, clients, shareholders, community members and distributors – can regulate or mobilise public opinion (Belal, 2002; Weiss, 2014; Meixell and Luoma, 2015). Many stakeholders rely on a business's own CSR reporting for information about conditions in its supplier factories (Locke and Romis, 2006). A lack of transparency therefore allows social risk to be overlooked by making it difficult for stakeholders to see (Carter and Rogers, 2008).

Shifts in societal expectations, growing affluence and globalisation have combined to further increase the strategic importance of CSR to a business (Carroll, 1979; Werther and Chandler, 2005; Perry and Towers, 2013). CSR is now a recognised source of competitive advantage with positive links to financial performance (Cho *et al.*, 2019). 93% of the world's 250 largest businesses publish annual CSR reports (KPMG, 2013). While transparency is unquestionably needed, this may sometimes be motivated more by reputation-risk management, PR or even marketing objectives than by a genuine will to improve working conditions (Wick, 2003; Locke, 2013). Risk management becomes desirable to a business when risk is understood as something that will prevent it from achieving its targets (Bagozzi and Yi, 1988; Köksal *et al.*, 2017). Damage to the corporate image brings loss of competitive resources (Hallikas and Lintukangas, 2016). Although corporate risk management has traditionally been focused on financial risk, it now encompasses anything that might trigger stakeholder pressure (Seuring and Müller, 2008; Köksal *et al.*, 2017).

Belal distinguishes between businesses truly committed to stakeholder values and those doing risk management for legitimacy reasons (Belal, 2002; Diouf and Boiral, 2017; Agostini and Costa, 2018). Legitimacy theory presents *legitimacy* as the generalised perception that the actions of a business are judged appropriate according to public desires and social norms (Ching and Gerab, 2017). The *social licence* for a business to operate concerns stakeholder approval for the activities of that business and can be interpreted as confirmation of legitimacy (Demuijnck and Fasterling, 2016; Gehman *et al.*, 2017). Augmenting the reputation of a business by exhibiting a commitment to CSR is one way to achieve this (Yates and Horvath, 2013). Under this understanding that factory standards do not, of themselves, hold merit, the concerns of workers only accrue merit where they influence other, often external, stakeholders (Egels-Zandén, 2014).

2.3.3. The role and methods of monitoring

Multinational businesses entering China in the 1990s brought internationally-defined responsible business practices into the country's factories, using their own private Codes of Conduct (CoCs) and supplier codes to monitor health, safety, working conditions and environmental standards (Grayson and Nelson, 2013). Such codes can be interpreted as corporate attempts to produce informal regulations to fill national institutional voids (Kolk and van Tulder, 2005; Locke, 2013). Academics agree, however, that a lack of standardisation in both labour regulation and private monitoring undermines transparency in the relationships between buyers, suppliers and stakeholders (Porter and Kramer, 2006).

A business generally adopts a CoC to set baseline standards and then to influence factories to work to them (Mamic, 2005). Most social standards are derived from the United Nations Global Contract (UNGC) labour standards. Developed from the International Labour Organization's (ILO) 1998 *Declaration on Fundamental Principles and Rights at Work*, the UNGC prioritises four fundamental principles: 1) freedom of association and collective bargaining; 2) the elimination of forced labour; 3) the abolition of child labour and 4) the elimination of discrimination in employment or occupation (Niforou, 2015).

Efforts to manage social risk among remote suppliers have given rise to an industry of social auditors, consultants and NGOs (Egels-Zandén, 2014). Audits may rely on any of a dizzying range of frameworks or checklists including those created by audit specialists themselves (Locke and Romis, 2006; Locke *et al.*, 2009; Seuring, 2013; Distelhorst *et al.*, 2015). A study for the World Bank identified more than 1,000 different corporate CoCs. Private initiatives offering supplier certification include the Global Reporting Initiative (GRI), ISO standards, the Sullivan Principles and the Caux Principles of Business (Smith, 2003; Hadwiger, 2015). Since different regimes have different requirement levels businesses might choose ones with low exigencies as a legitimacy front (Mamic, 2005; Mueller *et al.*, 2009). With no single global standard factories have become reliant on *benchmarking regimes* like the Sedex Members' Ethical Trade Audit (SMETA), the International Council of Toy Industries (ICTI) code or Walmart's CoC (Broome and Quirk, 2015; Short *et al.*, 2015; LeBaron and Lister, 2016). Appendix 2 compares these various regimes and Appendix 3 shows which are used by which brands to manage social risk in their suppliers' factories.

That data collected using factory audits can be unreliable has been identified by research (Locke *et al.*, 2007; Short *et al.*, 2014). With no consensus on what should be measured, research on factory work has exposed concerns not reported by auditors (Locke and Romis, 2006; Locke and Romis, 2007; Short *et al.*, 2015). Indeed, the deaths at the Rana Plaza complex in Bangladesh occurred in factories recently audited against the BSCI code (Sinkovics *et al.*, 2016). This audit had failed to identify the illegal construction of the building since it was outside its scope. Furthermore, an audit is a snapshot, typically taken during a factory visit of one or two working days, and during which workers' behaviour may be influenced by the auditor's presence. Well-being is an ongoing process. That the CoCs used to monitor factories in developing countries are created by western organisations adds cultural challenges (Kolk and van Tulder, 2005; Locke, 2007; Locke, 2013). Standards adopted globally may, rather than 'appropriate to each firm's strategy across supply chains' be too generic, failing to address local requirements (Porter and Kramer, 2006).

When it comes to gathering trustworthy data using factory auditing, academics also ask *Who is doing the audits?* Most businesses rely on audits which they have paid for themselves, conducted either by their own team or by private contractors (Lindholm *et al.*, 2016). These can never be expected to be fully impartial. Academics argue anecdotally that 'supply chain auditors are biased in favour of their paying clients' (O'Rourke, 2002; Esbenshade, 2004; Heras-Saizarbitoria and Boiral, 2013; Short *et al.*, 2014). Research has shown the gender, experience, training and rotation of an auditor impacting an audit's outcome, and there is evidence of bias due to influences like a history with the factory (Belal, 2002; Welford and Frost, 2006; Short *et al.*, 2014). This might lead to the assumption that there is little calibration between audits. Short and Toffel (2014) have observed that 'auditors often deny their vulnerability to conflicts of interest and socially construct a professional identity that emphasises their independence' (Dogui *et al.*, 2013).

The sheer number of different schemes and regimes has also generated excessive monitoring in factories, leading to confusion and *audit fatigue* (Locke *et al.*, 2013). Overburdened factories can develop a *checkbox culture* or even work the system by establishing a 'ritual of compliance' that allows risky factories to pass audits (Locke *et al.*, 2007; Locke *et al.*, 2013). They may choose to secure future orders by covering up issues, actually reducing transparency (Locke *et al.*, 2013). Nervous employees may be coached onto party lines (Sinkovics *et al.*, 2016). Data becomes unreliable, either because the worker has been told only to share certain information or from a more general fear of repercussions (Locke, 2013; Egels-Zandén, 2014; Niforou, 2015). There are reported instances of workers receiving training in what to say to auditors, and of factory managers falsifying payroll and working-hours records (Egels-Zandén, 2014; Niforou, 2015).

Finally, while audits can highlight the changes a factory would need to make for social compliance, those changes, which should be implemented by the supplier, often have costs attached (Jones and Raghunandan, 1998). It therefore seems reasonable to assume they may be deprioritised and might fail to happen without follow-up from the client.

While their value in ensuring the basic physical safety and health of workers in developing countries is unquestionable, the literature indicates that a reliance on audits is perpetuating a problem with achieving transparency into factories. Locke and Romis (2006) found audits sometimes useful as part of a larger project but warned against relying on them in isolation.

2.3.4. What is social sustainability?

As discussed, academics and industry practitioners agree on the importance of managing social risk in globally dispersed supply chains. However, current monitoring is undermined by a lack of consensus over the qualifications for social sustainability (Köksal *et al.*, 2017).

Global manufacturing has been blamed for human rights abuses (Sethi, 2003; Jones, 2006). Defined social risks include forced labour, low wages, safety issues, exposure to harmful chemicals and child labour (Dicken, 2007; Perry and Towers, 2013; Gardetti and Torres, 2017). While the most frequently implemented description of social sustainability is based on human rights as defined by the ILO and the UNGC, some academics expand its reach into the well-being of a worker. Some discuss well-being or PsyCap specifically while working (Luthans *et al.*, 2005; Luthans and Youssef, 2007; Luthans *et al.*, 2008). Others also consider a factory's impact on its wider community (Gimenez *et al.*, 2012). To some, it means 'equitable opportunities, encouraged diversity, community support and connectedness, ensured quality of life and the promise of support from governmental structures' (Gimenez *et al.*, 2012; Gimenez and Tachizawa, 2012).

In addition to defining basic human rights at work, the ILO mentions as possible indicators of working conditions: 1) wages, vocational skills and development opportunities (i.e. access to training and promotion); 2) working time (i.e. work-life balance); 3) maternity leave; 4) employment security (including contracts); 5) occupational safety and health (physical and mental well-being at work) and 6) social insurance (access to healthcare) (Hakemulder, 2015). No auditing system reviewed for this research checked for access to training and promotion or for work-life balance (see Appendix 2). The World Health Organization defines health as: 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (Leciejewski, 2016; WHO, 2020). It can therefore be understood that audit regimes which do not consider workers' mental or social well-being fail to adequately ensure their health. Social audits tend to focus on easily-observed physical working conditions. Few of the regimes seen also assessed psychological well-being beyond identifying management abuses such as discrimination, physical abuse or harassment. Workers' dignity, for example, is rarely considered. The suicides of workers at the Foxconn electronics factories occurred despite frequent auditing on behalf of their western clients (Chan and Ngai, 2010).

The literature discussed above suggests that audits are unreliable but does not show how social sustainability could be better achieved without them. Because social sustainability is difficult to quantify and businesses believe it is costly to act upon, there are few precedents

for research in the field. In terms of Elkington's *triple bottom line* – a framework to allow businesses to measure their social, environmental and financial impacts – it has been observed to be under-represented relative to the other two (Elkington, 1997; Hartini and Ciptomulyono, 2015). In its quest for transparency, supply chain monitoring needs to find a way to include the well-being of the workers. Even audits using appropriate well-being indicators would be unlikely to produce reliable data. To audit well-being would mean evaluating personal issues such as feelings of safety, which, academics argue, are 'difficult to observe or rank', and about which workers may struggle to share honestly at work, particularly given the imbalance of power between observer and observed (Anner, 2012; Chan, 2013; Egels-Zandén, 2014).

2.3.5. A problem with transparency

The literature on SSCM is broadly summarised in a model for social sustainability created by Köksal and Strähle (2017). This outlines relationships between three key actors in a supply chain – stakeholders, the buying business and the factory – and their barriers, enablers and drivers to social sustainability performance. While this is useful and shows the tensions well, in Figure 2, below, it has been adapted to illustrate a problem concerning how the well-being of workers and their relationships with their factories are currently excluded, not just from the model by Köksal and Strähle, but from SSCM generally. This may be due to the siloed scope of the wide range of relevant journals, and of the expertise of their editors and contributors. Rather than being constrained by the SSCM paradigm, or any other theoretical perspective, a fully interdisciplinary approach seems likely to prove more productive. Social risk management and CSR reporting, which appears here to stop at the factory's management, urgently needs to go a step further into the supply chain to consider those most affected by social risks, the workers themselves.

Figure 2: Framework for SSCM, adapted to show how workers are currently overlooked
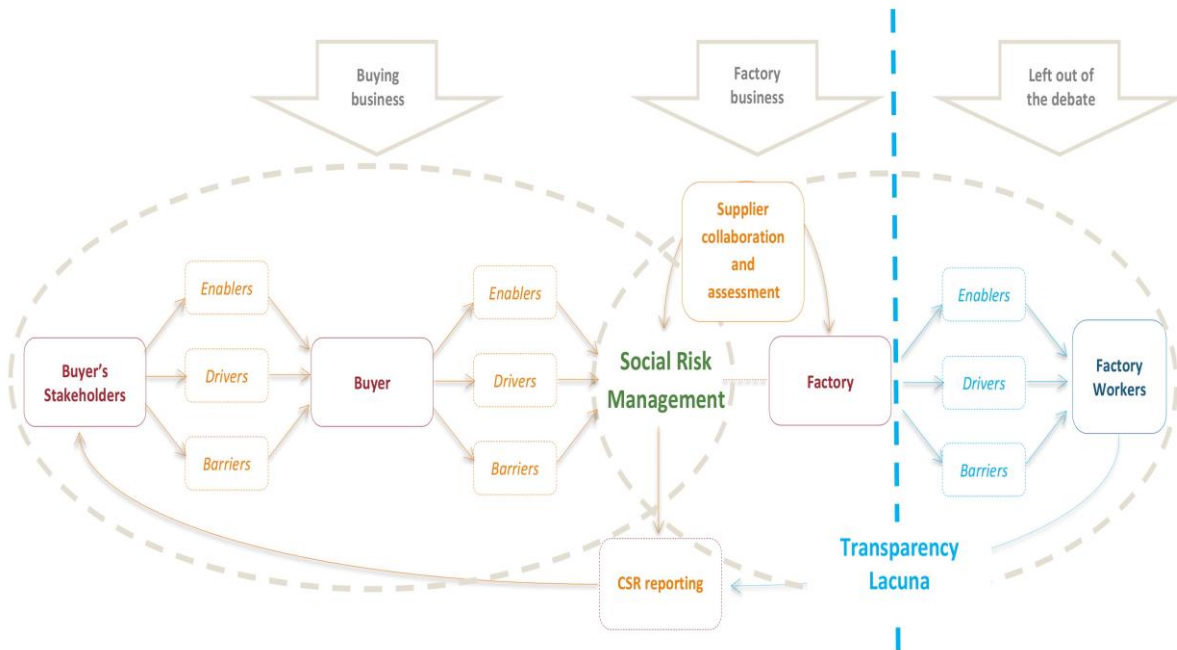
Adapted from the model by Köksal et al., 2017

León and Calvo-Amodio (2017) have suggested that social measures should promote the personal well-being of all stakeholders. Tench and Yeomans (2009) observe that 'important stakeholders for a company now do not only include employees, customers and shareholders, but also members of the communities in which the company operates, as the company is part of the infrastructure in society and therefore must consider its impact on it'. Yet a supplier factory's workers, both indirect employees and members of that factory's community, are widely excluded as stakeholders in the buying business. Although Meixell and Luoma (2015) stress that they should be recognised as critical stakeholders, neither stakeholder theory nor this framework mentions them or their relationship with their factory. Those drivers, barriers and enablers are not even considered.

Reviewing this literature suggests that very little research has incorporated these workers or allowed them to express their own needs. Industry social sustainability initiatives fail to consult them. Little-to-nothing is known about them or what they need from their workplaces, creating an important problem for social sustainability theory and practice. Despite pressure from those who are recognised as stakeholders, both social risk and the associated reputation risk to businesses persist. Meanwhile, those at the heart of the problem, who could best indicate challenges to their own well-being, are largely ignored. Focusing primarily on the wishes of other stakeholders means businesses decide what is best for these workers without allowing them to voice their own opinions (China Labor Watch, 2011; Estlund, 2018). The workers and their well-being need to be at the forefront of the social sustainability debate.

2.3.6. Giving workers a voice

Processes for consulting workers referenced in this literature were mainly concerned with the procedures and avenues provided for *worker voice*. Wilkinson and Fay (2011) have defined *voice* as 'how employees are able to have a say over work activities and organisational decision-making issues within the organisation in which they work'. Ethnographic accounts have described it as a way for workers to exercise agency (Gunawardana, 2014).

Worker voice in factories arises most often via standards such as ISO, rather than as a discrete intervention (Soltani *et al.*, 2018). Zajak (2017) has identified worker surveys during audits, workplace complaint procedures and local grievance mediation as formal channels able to help to integrate the concerns of workers into SSCM well-being parameters. Other extant channels include workers' councils and anonymous letterboxes (Gunawardana, 2014).

Collective worker voice is sometimes framed as a hindrance to a business, particularly when it threatens the authority in workplace hierarchies (Gunawardana, 2014). For this reason, it is often left to formal channels, usually using a trade union as a mediator (Jürgens and Krzywdzinski, 2016). In 2008, China's labour laws changed to permit collective bargaining, although this is unlike that seen in western factories: only unions affiliated with the All-China Federation of Trade Unions, the Communist Party's official organisation, are permitted.

While risk can be mitigated through active and communicative HRM, voice may therefore be overlooked by HRM as the domain of trade unions (Dundon *et al.*, 2004). Attempts to encourage worker voice in factories have had mixed results (Soltani *et al.*, 2018). Management may neglect to provide official, formal grievance procedures or these can fail if workers are unaware of the procedures or distrust formality (Zajak, 2017; Soltani *et al.*, 2018). Worker-participation activities like *improvement forums*, if not incentivised with greater autonomy, can burden workers with forced participation without improving their well-being (Zhang, 2015). Furthermore, many workers see their suggestions, particularly for improvements which would influence their well-being, unanswered (Zhang, 2015). Precarious workers, whether in terms of employment or social position, are less likely to voice a concern (Soltani *et al.*, 2018). A Chinese factory worker may have reason to fear that this would result in unfair dismissal, wage deductions or worsened working conditions (Soltani *et al.*, 2018). Without any voice, however, workers may resort to 'foot-dragging' on tasks (Levi, 2019).

Informal channels are therefore important in China. With online access to information allowing them to identify when an employer is violating labour laws, 'today's migrant workers are better equipped to carry out a strategy of voice' that includes using mobile

phones and online chat rooms to communicate working conditions or protest strategies (Unger and Siu, 2019). Chinese workers have organised to advocate for themselves, friends and family and to expose those factories mistreating their workers (Chan, 2017). Sharing about individual cases and their outcomes allows workers to collectively learn what protest can or cannot achieve (Unger and Siu, 2019). This would include that striking when a factory needs to ship to a buyer exerts the strongest pressure (Anner, 2018). Striking, however, is used as a last resort and usually to protest only violations of workers' standardised legal rights (Chan, 2017; Fransceschini, 2020).

Factory workers may also want to share feedback about how their work is organised or suggest changes which could improve general efficiency. Literature shows continuous improvement helping to attenuate workers' stress levels, improving their well-being (Stimec and Grima, 2019). Since they are close to the factory's core tasks, their input could also be valuable to factory management. While such initiatives can improve the quality-of-life of workers, more formal channels may better allow them to air workplace well-being concerns.

This literature as a whole suggests that in China, informal channels might be most effective. Auditors may sometimes interview workers in their factories but without producing much real insight. Social media groups could be used, although many workers would still want to remain anonymous, necessitating an intermediary like an NGO or a nominated spokesperson. The challenges to establishing channels which give workers a genuine voice may be one reason workers are not yet universally perceived as stakeholders in SSCM.

2.3.7. A different working model for Chinese factories

More and more Chinese factories are now employing a Lean approach. This is often an attempt to meet client demands for lower costs and reduced lead times by streamlining production (Taj, 2008). Factory labour shortages and the increasing minimum wage also create a need for efficiencies. *Lean* improves factory performance through eliminating waste and optimising processes. Although Lean is not designed to improve workplace well-being or to manage social risk, some studies suggest workers derive positive social effects from some styles of Lean management. This evidence has led to the discussion of its potential to facilitate socially sustainable manufacturing in developing economies. Caldera and Desha (2017) said: 'Lean thinking can be considered as a business model archetype of sustainable and social manufacturing areas […] given its role in actively empowering people to generate new ideas and engaging them in implementing new initiatives.' Research in a Nike global supply chain associated Lean adoption with a 15 percentage-point reduction in non-compliance with labour standards, primarily around wages and working hours (Distelhorst

et al., 2016). It also found improved motivation among workers unlocking performance benefits for the factory.

In the traditional mass production common in Chinese factories, workers complete the same, narrowly-defined task (such as adding a single component to a product) all day, every day. Lean aspects mentioned in studies as supporting the well-being of workers include job complexity, workers' training and HRM that ensures this is monitored and implemented. Job complexity requires workers to acquire new technical and interpersonal skills, meaning they need training, which is itself motivating (Womack *et al.*,1991; de Treville and Antonakis, 2006; Longoni *et al.*, 2013). While task-based production lines may require each worker to work alone, Lean allows for increased autonomy and cross-skills training, encouraging collaboration (Cappelli and Rogovsky, 1998). Appelbaum (2000) found working together led to more efficient production, reducing lead times and improving quality across a range of industries and skill levels. More standardised training and fewer hierarchical structures generate worker input and a sense of homogeneity (León and Calvo-Amodio, 2017). While providing more training increases the turnover-cost per worker, Lean thinking can increase the individual's efficiency, improving absenteeism and leading to better pay (Helleno *et al.*, 2017). More motivation then improves retention. Cottini (2011) found allowing workers to set their own working practices reduced worker attrition, allowing them to build experience and cutting overall hiring and training costs.

Some literature suggests that Lean in factories can engender role enrichment, participation and engagement while its team emphasis and decentralised decision-making builds trust and mutual respect (Hasle *et al.*, 2012; Longoni *et al.*, 2013). A Chinese factory, under pressure to reduce its lead times and costs, may find implementing role enrichment, participation and engagement challenging. Supportive academics claim workers work 'smarter rather than harder' within Lean and therefore experience less work-related stress, but others say Lean which does not prioritise involving the workers may destroy what autonomy they had (Womack *et al.*, 1991; Wickens, 1995; Hasle *et al.*, 2012). Certain Lean concepts, particularly Just In Time, can increase a worker's stress if not paired with HRM that ensures their training, monitors their overtime and provides the social support they might require (Brown and O'Rourke, 2007; Hasle *et al.*, 2012; Longoni and Cagliano, 2015; Henao *et al.*, 2019). HRM processes to monitor working hours, provide training and development opportunities for workers and communicate and manage workers' benefits have not traditionally been a priority in Chinese factories, whose HRM seldom extends outside of operational aspects like hiring and payroll or meeting basic audit requirements (Luthans *et al.*, 2005).

Detractors have argued that Lean can cause work intensification, engendering a system of *management by stress* (Delbridge *et al.*, 1992; Parker and Slaughter, 1988; Cullinane *et al.*, 2014). Huxley (2015) has argued that such factors, combined with the absence of genuine skill development – which would depend upon both HRM and workers' training – can keep many instances of Lean from its positive potential. Yasukawa and Brown (2014) observed that Lean training focuses on stabilisation, leaving little space for the creative thinking more likely to motivate workers.

Furthermore, literature indicates a lack of worker-focused research on Lean production (Huxley, 2015). It is so far unable to link the business-wide incentive to increase organisational productivity with individual personal motives like workers' longer-term goals and the need to earn a living (Yasukawa *et al.*, 2014). Bridging this divide by emphasising community development and goal-setting would allow Lean trainers to increase work motivation from both top down and bottom up (Yasukawa *et al.*, 2014). With the proper coaching and feedback, Lean can help workers to develop the strategic thinking necessary for transformational techniques and practical organisational learning (Salehi and Yaghtin, 2015).

Achieving this in a Chinese factory would require investment not only in the provision of work-skills training for the workers themselves, but also in communication training for their managers to ensure better working conditions, and in information sharing to align the workers' perceptions (Brown and O'Rourke, 2007; Cobb, 2013). Understanding the goals of these workers would make it possible for businesses to evolve to incorporate techniques to motivate them. To do this a factory would need not only to implement HRM but also to create a channel allowing workers' voices to be heard without fear of repercussions. The informal voice channels which appear most successful in China may provide a useful model.

The literature evaluating Lean outcomes documents either some negative impacts on working conditions and consequently health, mainly from low-complexity manual work like that done on production lines, or a 'mixture of positive and negative effects on working conditions and well-being' (Landsbergis *et al.*, 1999; Jackson and Mullarkey, 2000; Godard, 2001; Anderson-Connolly *et al.*, 2002; Seppälä and Klemola, 2004; Conti *et al.*, 2006; Hasle *et al.*, 2012; Cullinane *et al.*, 2014). Little empirical evidence exists to resolve the debate (Anderson-Connolly *et al.*, 2002; Parker, 2003). Signoretti and Sacchetti (2020) suggest Lean accompanied by supportive HRM practices can increase the competitiveness of a business through skilled and empowered workers. Even once HRM processes had been implemented, and a channel opened to give these workers a voice, there would nevertheless remain a need to understand how to define and measure their well-being.

2.4. Defining and measuring workers' well-being in Chinese factories

To implement social sustainability in global supply chains would first require an understanding of the factory workers and what factors impact their well-being. That China's factories are struggling to maintain staffing levels renders retention increasingly important. With factory workers able to choose their employers, fair wages alone will not hold them. The well-being of a factory's workers could become a competitive advantage in terms of recruitment as well as being key to the CSR of its clients, yet it remains misunderstood.

2.4.1. Conflicting narratives

One particular challenge in this respect is the presence of two apparently contradictory narratives. Significant investigative journalism has focused on China's Special Economic Zones, which exist to service foreign marketplaces, and on factories such as Foxconn, which supply world famous consumer brands. Reports detail long hours, low wages, management abuse, inhumane conditions and workplace injuries to apply moral pressure on stakeholders to push for better rights for workers (Woon, 2000; Chan, 2001; Jacka, 2014). The image of the *dagongmei* (a female rural migrant worker) provides a 'metaphor for the corrosive effects of the market' (Fu, 2009; Jacka, 2014). While this has inspired some western research, it does not constitute useful data. Furthermore, it perpetuates the stereotypes which can lead to stigmatisation.

Today's migrant workers do not appear to see themselves as victims (Woon, 2000; Ngai and Lu, 2010; Jacka, 2014; Siu, 2015). Leslie Chang, in a TED talk, has suggested their concerns are perhaps not those westerners imagine (Chang, 2012). For many, factory work is voluntary labour, a part of China's globalisation and modernisation and a chance to rise above their rural circumstances. Xiaoming, a dagongmei, explained: 'You people nowadays no longer like tilling the fields. I didn't either.' (Ngai, 2005). Factory work may offer access to a city full of new opportunities (Ngai and Lu, 2010; Jacka, 2014; Siu, 2015; Yang and Gallagher, 2017). China's globalisation has forced its workers to think more individualistically and they now straddle the line between collectivistic and individualistic motivations (Earley, 1994; Luthans *et al.*, 2008). The latest generation, collectivistic in terms of family values and orientation but individualistic and entrepreneurial in business, seek the skills to be competitive in the global marketplace (Luthans *et al.*, 2005; Luthans *et al.*, 2008; Ngai and Lu, 2010; Jacka, 2014; Koo, 2016; Siu, 2017). City life includes the potential to study (Jacka, 2014; Siu, 2015; He and Wang, 2016).

Rapid change has shaken the resiliency of some Chinese workers, particularly among male migrants (Fu Keung Wong and Song, 2008). Uncertainty, stress and anxiety may lead them to doubt their ability to adapt (Luthans *et al.*, 2008; Zhu *et al.*, 2011). Factories became places of conflict as urbanisation, promoted to boost economic growth, challenged the ancestral privilege of urban populations (Zhu *et al.*, 2011; Kim, 2015). There is a sense in China of hierarchies of workplace, and factory jobs are commonly stigmatised in urban environments (Lucas *et al.*, 2013). As supply chains incorporate newly developing countries, with different socio-economic and cultural inputs, observers will need to consider cultural attitudes to factory labour to understand its impact on well-being (Lee *et al.*, 2014; Aslani *et al.*, 2016; Fosse *et al.*, 2017). Unfortunately, academics are perpetuating exclusion by not bringing factory workers into the social sustainability debate.

Migrant workers also report that community is important to their well-being at work (Ngai, 2005). The ubiquity of smartphones among both the workers and their rural relatives allows them to maintain extensive networks (Law and Peng, 2008; Siu, 2015; Liu and Leung, 2017). However, social differences can inhibit colleague relationships (Lau *et al.*, 2012; Chu and Hail, 2014; Liang, 2015; Siu, 2015). Those from ethnic minorities may struggle to integrate due both to language barriers and to other, less obvious, cultural differences. Social exclusion interferes with the development of social relationships in new living and working situations and this can undermine motivation and resilience (Liang, 2015).

Workers remain vulnerable to the subjective effects of undignified workplace interactions including 'mismanagement, abuse, overwork, incursions on autonomy, and contradictions of employee involvement' (Lucas *et al.*, 2013). Studies at Foxconn clearly found depersonalisation, institutionalised corporate abuse and overwork (Chan and Ngai, 2010; Lucas *et al.*, 2013). Foxconn's simplified production process, excessive production quotas and standardised posture and chair placement was seen to make its workers feel like machine components (Lau *et al.*, 2012; Lucas *et al.*, 2013). Even after the suicides there is still little understanding of the true impacts on these workers' well-being or of their priorities. Despite investments by the large consumer electronics brands manufacturing with Foxconn, the audit-based method used before the suicides remains the only mechanism for understanding life in these factories. Workers are still not part of the debate on social risk management; their well-being is still neglected by both theory and research, and not considered in practice.

During the media exposure of conditions at Foxconn, dignity became a buzzword. As well as being a key concept in the definition of human rights, *dignity* here refers to humane working conditions and disciplinary practices (Hodson, 2001; Lucas *et al.*, 2013; Bal, 2017; van der

Rijt, 2017). Tied to self-respect and essential for overall self-worth, its meaning varies across cultures (Lucas *et al.*, 2013; Lee *et al.*, 2014; Aslani *et al.*, 2016; Fosse *et al.*, 2017). In Asia dignity is earned, judged by others, and relational within a meritocratic focus on duties and differences (Brennan and Lo, 2007; Lee, 2008; Kim and Cohen, 2010; Lucas *et al.*, 2013). Lau and Cheng (2012) refer to workplace indignity as an effort-reward imbalance or 'lack of reciprocity between gains and costs' that creates emotional distress.

Traditionally, China's factory workers have been motivated by purely economic exchanges, with pay determined by close supervision, monitoring or output, rewarding workers as closely as possible for their specific contributions (Ouchi, 1980; Tsui *et al.*, 1997; Konrad and Mangel, 2000). Migrant workers often prefer to work longer hours, compressing a year's work into a shorter time-frame before returning to their families for major holidays. As well as potentially generating work-life conflict this poses a risk both to their human rights and to their well-being. Performance-based pay can create uncertainty, as it means monthly income cannot always be predicted. Where production-line workers are expected to work together as a team, if their pay is based on team performance, individual differences in performance can generate friction. Divide-and-rule tactics may include the hidden bartering systems described by Siu (2017). With harsh hours and low wages, workers are then motivated only by a 'fierce struggle for upward advancement', for example to become line leaders (Siu, 2017). Hard work is then justified by ambition or the desire to gather the funds to travel or to change jobs (Ma and Trigo, 2008; Jacka, 2014; Siu, 2015).

The confusion about what really affects the well-being of these workers or is truly important to them is reflected in the literature. A study in a textile factory for the Better Work Programme (an ILO and International Finance Corporation partnership aiming to improve labour standards and competitiveness in global supply chains), reported that more than 90% of those surveyed said they were at least *somewhat satisfied* with their life, with about 20% *very satisfied.* It also found feelings of extreme hopelessness, sadness, frequent crying, restlessness and fearfulness among a very small minority (Adler *et al.*, 2017). Such results make it difficult to imagine the true picture.

As the need to retain and develop factory workers in China intensifies, well-being gains importance for businesses. There is currently insufficient information, however, to ascertain what specific measures could support the well-being of factory workers. The subject is neglected in the academic theory and media narratives often conflict (Jacka, 2014). What is apparent is that the audit regimes used by western businesses to monitor conditions in remote

factories are not helping them to understand the priorities of the workers, or to support those workers' well-being.

The literature on SSCM theory had usefully discussed the drivers, barriers and enablers of social sustainability concerning stakeholders. However, its lack of focus on the workers, who are critical to social sustainability, suggested a direction for the further development of SSCM. The drivers, barriers and enablers between them and their factories would need to be uncovered by refocusing the review on the fundamental theories of well-being.

2.4.2. The theories of workplace well-being

Academics have been considering well-being at work for decades, yet despite considerable interest in the west this review found few studies exploring the concept among factory workers, and fewer still considering those in developing countries (Chan, 2001; Fisher, 2014; Jacka, 2014). The theoretical models of workplace well-being found were nevertheless useful. All draw on three distinct types of well-being: *hedonic* – i.e. focused on pleasant experiences; *eudaimonic* – focused on inner development; and *social* – focused on relational aspects (Fisher, 2014). These can be interdependent and act together, leading to their use in various theoretical constructs and in different contexts and combinations (Gallagher *et al.*, 2009).

In well-being theory, *hedonic* well-being 'focuses on happiness, defining well-being in terms of pleasure attainment and pain avoidance' (Di Fabio and Palazzeschi, 2015). Most organisational behaviour studies have concentrated on hedonic aspects such as positive affect. Job satisfaction has long been their most widely researched concept (Weiss and Brief, 2001; Wright and Nishii, 2006). Increasingly, however, studies rooted in positive psychology have begun to prioritise eudaimonic well-being issues such as meaning at work and purpose in life (Pratt and Ashforth, 2003). In the last two decades, more studies have addressed the social aspects of workplace well-being, which can include the quality of relationships with colleagues and managers (Dutton, 2003). Figure 3, below, shows examples of well-being types as typically seen in life and work.

Figure 3: Examples of types of well-being as seen in life and work

Context	Type of well-being		
	Hedonic	Eudaimonic	Social
Life	Affect Life satisfaction	Autonomy Purpose in life Self-acceptance Personal growth	Social acceptance Social integration Relations with others
Work	*Intrinsic motivational states*		Relationships with peers and leaders Social support Group cohesion
	Affect Job satisfaction Organisational commitment	Job involvement Work engagement Meaning at work Calling at work	
	Flow		

Reproduced from Bellingan et al.*, 2020.*

The literature shows these concepts leading the research along two distinct pathways. While some academics have set out to learn how well-being can be nurtured, others seek to demonstrate links to work performance. While a link to performance should motivate the nurture of the well-being of these workers, the nature of any link has not yet been clearly demonstrated.

Psychological well-being is a factor in various manufacturing management theories. Outside SCM or SSCM literature, most attention has been paid to testing correlations between performance and positive traits such as those listed by Luthans and Avolio (2005), and primarily in western workplaces. While many studies, especially in SSCM, focus on physical conditions, work environments are also social and organisational, and both aspects can significantly impact work satisfaction and well-being (Manaf *et al.*, 2019).

The priorities of China's workers have changed as physical factory conditions have improved (Unger and Siu, 2019). In the workers' *hierarchy of needs* basic survival takes precedence over voice, job satisfaction or mental health (Maslow, 1943). Workers only consider their higher needs once the basic ones are met (Soltani *et al.*, 2018). While they view safe working conditions and fair wages as basic rights, Chinese migrant workers may also need career aspirations, hope and strong self-worth. Work which does not prepare them for advancement offers nothing but wages (Lau *et al.*, 2012). They value training and management that encourages and motivates productive behaviour (Luthans *et al.*, 2005; Luthans *et al.*, 2008).

The literature indicates the importance of social aspects of workplace well-being, which include relationships with management as well as those with colleagues (Dutton, 2003). It has also indicated that performance-based pay and desires for upward mobility might undermine these relationships, impacting workers' well-being.

What workers expect from their factories in terms of physical environment may not reflect western metropolitan standards. Many are migrants from undeveloped rural areas. A factory's dormitories and working environment could be more than acceptable to them. In China, 'choosing to work in a factory can be seen as an act of agency' by such a worker, similar to leaving a sub-par factory for employment elsewhere (Ma and Jacobs, 2010). As Chinese factory work evolves and advancing technology allows the workers access to more information, they have become more concerned with achieving an urban lifestyle and an urban education for their children (Unger and Siu, 2019). Stakeholders such as consumers most often ask businesses *where*, *by whom*, and *under what conditions* their products are sourced or produced (Benoît-Norris *et al*., 2012). Driven by the descriptions of factory conditions in the western media, they are likely to misunderstand, pushing further for basic human rights rather than for management styles designed to promote mental health, worker autonomy and continuous skills-improvement.

Empowerment in a factory is related to an individual's choice and agency (Ahmed, 2004). Mental health problems can therefore arise despite well-being factors such as economic empowerment (Akhter *et al*., 2017). Leblebici, who found the behavioural environment to affect work performance more than the physical workplace, has described a positive behavioural workplace as dependent on four factors: 1) goal setting to guide behaviour and motivation and to facilitate open communication; 2) performance feedback between workers and supervisors, to help a worker to understand their role in the business; 3) defined processes including descriptions of workflow, what is expected of workers and any available rewards and 4) supervisor support, which is indicated by positive interpersonal behaviour that increases the worker's self-confidence (Leblebici, 2012). The literature suggests that HRM processes, including the communication of goals, expectations and rewards combined with training, can help workers to feel those goals are achievable. Literature further suggests that training for managers might help to ensure those goals are communicated clearly and feedback is given in a positive and supportive manner.

A worker needs to believe their tasks are achievable and that they can learn to do them well and perhaps be promoted. Limited agency or social mobility may leave them feeling disempowered and isolated (Akhter *et al*., 2017; Hewamanne, 2018). A lack of promotion

potential can lead to negative organisational behaviour, poor work attitudes and belligerence toward colleagues (Jaesok, 2015). A worker can internalise external negativity, which might include being treated as a commodity, devalued, socially marginalised or subjected to violence or harassment (Perera-Desilva, 2015; Akhter *et al*., 2019). To *humanise* the work in factories, which is fundamentally very operational, would require HRM and organisational techniques to improve job satisfaction and the quality of working life (Carpentier, 1974). However, there is still little understanding of what can impact the quality of some workers' lives and therefore their well-being.

While often wrapped into discussions of workers' agency or voice, in other cases workplace well-being has been characterised by engagement, motivation or mental health. Alfes and Shantz (2013) holistically defined *engagement* as comprising emotional, cognitive and physical components, presenting HRM and perceived organisational support (POS) as able to boost a worker's engagement through interventions such as feedback, training and task variety, resulting in proactive behaviour, well-being and decreased turnover intention. Workers seek job-related training, professional development, education – particularly in computing and foreign languages – and opportunities to develop transferable skills (Ma and Jacobs, 2010). Self-worth can develop through the promise of upward mobility or positive feedback from supervisors as well as from external validation such as expressions of support or gratitude from friends or family (Hewamanne, 2018; Levi, 2019). POS also allows for social reciprocity, generating socio-emotional benefits which are key to well-being (Alfes *et al*., 2013).

This literature indicates that the physical working environment is becoming less important as conditions in factories generally improve. Eudaimonic well-being factors, both organisational and social, significantly impact well-being, suggesting that good workplace relationships are key. To create relationships that provided encouragement and positive performance feedback in a Chinese factory would require training for most line leaders. Ensuring that the workers are trained to be able to perform the tasks required and feel that the goals set for them are achievable is also necessary to their well-being.

2.4.3. POBs and PsyCap

Most well-being research was conceived and conducted in the west, and is therefore liable to overlook significant cultural factors. Indeed, most took place with workers who had a clear delineation between their at-work and out-of-work lives. Migrant factory workers, on the other hand, usually live with colleagues in dormitories, some travelling home only once a year, making the distinction less clear for them.

Unusually, three studies, the two led by Luthans (2005; 2008) and a more recent one by Seo and Chung (2019), were found to have specifically considered well-being in Chinese factories using PsyCap as a theoretical framework. This prompted a more general investigation of PsyCap and its theoretical context.

POB theory, which aims to boost organisational performance through increased motivation, is 'the study and application of positive-oriented human resource strengths and psychological capacities that can be measured, developed and effectively managed' (Singh, 2015). It focuses on 'positive psychological capacities' which can be either state-like or trait-like and can be developed and implemented through training (Luthans, 2002a; Luthans, 2002b; Luthans *et al*., 2005; Joo *et al*., 2016; Luthans and Youssef-Morgan, 2017). While criticism may only restore a person's behaviour to equilibrium, positive psychology tempers its demotivational impact by shifting the focus from deficits to strengths, fostering positive development (Smith, 2006; Luthans *et al*., 2005).

PsyCap theory emerged from the application of positive psychology, including POB attributes, to Human Capital theory (Luthans, 2002a; Luthans, 2002b; Luthans *et al*., 2006). PsyCap, which indicates a worker's psychological resources, has been shown to improve both well-being and work performance (Luthans *et al*., 2005). It can increase an individual's ability to cope, adapt, form positive relationships and remain motivated.

Luthans (2002) has proposed its component POBs as *hope*, *self-efficacy*, *resilience* and *optimism*, suggesting the combination can engender 'organisational citizenship behaviour' and a 'mastery-oriented mindset toward training' (Luthans *et al.*, 2011; Qadeer and Jaffery, 2014; Pouramini and Fayyazi, 2015; Nolzen, 2018). Literature suggests that PsyCap can predict an individual's ability to problem-solve (Hsu and Chen, 2015). It allows a worker to feel more resourceful and engaged, and less stressed, even in a challenging workplace, boosting productivity (Siu *et al.*, 2014; Mazzetti *et al.*, 2016; Joo and Lee, 2017). Nel and Kotze found it, combined with tools like meditation, able to mitigate even extreme stress, preventing burnout (Nel and Kotze, 2017).

While PsyCap had already been the theoretical foundation for many papers, the Luthans studies were the first to consider it in manufacturing in the developing world. Luthans and Avolio (2005) would make the first attempt to determine PsyCap's applicability outside the USA. They used surveys in three Chinese factories to measure PsyCap using a prototype Psychological Capital Questionnaire (PCQ) and a Likert scale allowing workers to quantify their own positivity. Both individually measuring hope, resiliency and optimism and assessing composite PsyCap allowed for insight into which of the three POBs were highest in each

circumstance. Workers with higher PsyCap scores showed higher performance ratings, based on supervisor surveys. The authors drew a useful theoretical distinction between POB states and traits. While traits are aspects of individual disposition, states come and go and are therefore easier to manipulate in a workplace setting (Luthans *et al.*, 2005).

Luthans and Avey (2008) expanded on this, including a clearer summary of PsyCap theory and including the POB of self-efficacy. They suggested some implementable actions such as goal-setting to foster hope, group training for self-efficacy and fostering optimism by creating positive expectations (Luthans *et al*., 2008). Suggesting state-like resilience could be developed, the article lacked a specific prescription for this. It did, however, note the influence of national culture on organisational behaviour. Its cultural analysis described privately-owned Chinese factories as areas of change and stress at the forefront of a large emerging economy retaining the ghosts of a communist system (Luthans *et al*., 2008). This indirectly highlighted the importance of implementing HRM throughout the full structure of a Chinese workplace, including with management themselves.

These two studies are important as the first to consider the PsyCap of factory workers in China. However, surveys in Chinese factories face identified data-integrity risks. Their use here could not be expected to achieve true transparency. A supervisor's subjective assessment of performance could not be assumed reliable when supervisors, as observed by auditors, can show bias about their own workers. PsyCap theory puts the onus on management to create a positive work environment. Low performance in this context might therefore reflect negatively on the supervisor. Line leaders put in this position might fear retaliation from senior management if poor performance was reported. Additional data regarding merit-based pay was used for validation in some cases but the authors acknowledged the potential for bias there also (since assessed merit may reflect deals, favouritism or interpersonal relationships) and that it would be preferable to use objective, numerical performance data.

These studies did not consider PsyCap's social-sustainability or risk-management implications. They linked positive PsyCap to work performance but not to work environments or the cultural context described. It is also unclear whether the challenging research environment influenced the results. Finally, well-being evaluations were only captured once, where a longitudinal approach would allow POBs to be tracked. Crucially, the approach did not include soliciting the workers' own opinions.

Of PsyCap theory's four psychological states, *self-efficacy* is defined as a worker's belief in their own ability to achieve their goals, whether personal or professional (Luthans *et al*., 2008). It develops through understanding-experiences, confidence and choice (Bandura,

2012). Goldstein, as quoted by Modell (1993), said: 'An individual's realising their full potential equates to self-actualisation, which is the highest component of well-being'.

To address the barriers to management across global supply chains and to consider migrant workers, who live in two different cultures at once, cross-cultural approaches may be required. Reichard and Dollwet (2014) describe self-efficacy as able to allow individuals to work across cultures and in diverse settings. It can aid migrants in developing new ways of thinking and behaving (Black and Mendenhall, 1991; Luthans *et al*., 2006; Wang *et al*., 2017).

Resilience is most closely linked to an individual's ability to work productively in the face of difficulties, stress and setbacks (Ong *et al*., 2006; Fletcher and Sarkar, 2013). The resilient state allows positive emotions to arise while an individual is experiencing stress, through more flexible thinking and problem-solving, adaptive coping and a chance to build strong social resources (Ong *et al*., 2006). It can spark enhanced well-being as the individual works through a stressful situation (Ong *et al.*, 2006). Coutu (2002) described resilient individuals as those who 'accept reality, strongly hold on to meaningful and stable values and beliefs, and possess effective adaptive mechanisms that allow them to flexibly improvise in response to unexpected situations' (Wolin and Wolin, 1994; Luthans and Youssef, 2007; Cope *et al*., 2016).

Figure 2 (page 29, above) shows the transparency lacuna discovered in the SSCM theory, with workers and their drivers, enablers and barriers to social sustainability seen to be missing from the research. The theoretical literature on well-being at work had begun to suggest how a deeper understanding of the workers and their well-being might be uncovered. PsyCap theory began to suggest what the drivers and enablers might be between workers and their factories.

Workers' self-efficacy, hope, optimism and resilience might be seen as drivers. Both PsyCap and Lean theory would indicate training within improved HRM as a potential enabler. Workers' self-efficacy and optimism might be enabled through regular work-skills training, and their resilience and hope by training their line leaders to be more positive and supportive and to set clear goals. This would better allow workers to bounce back during stressful times or when struggling to complete tasks (Luthans *et al*., 2008). Barriers in this context might include inadequate training, mismanagement or a loss of hope reducing their willpower and ability to see a pathway to their desired goal (Snyder, 2000; Snyder and Lopez, 2002; Luthans *et al*., 2008).

Figure 4, below, shows these potential enablers, drivers and barriers mapped onto the previously identified transparency lacuna.

Figure 4: Possible drivers, enablers and barriers to social sustainability within a factory
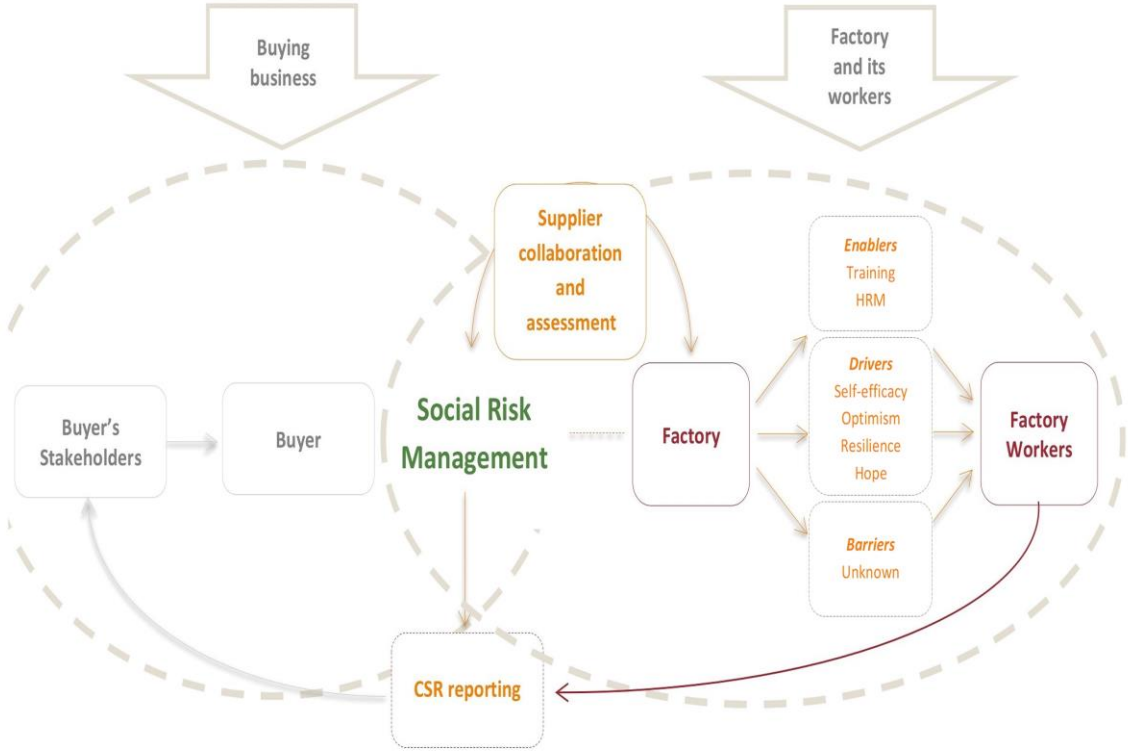
Adapted from the model in Köksal et al., 2017

Lean production prioritising positive psychology might therefore prove a strong vehicle for well-being improvement. Hartini and Ciptomulyono (2015) found Lean to positively impact the triple bottom line but observed that its impact on social aspects is not well-researched. Lean is widely familiar to factories. PsyCap's metrics could potentially be used to measure impacts.

There were initial reservations about using PsyCap as a theoretical framework for this research. It is derived from western views of workplace well-being. In emerging countries like China, factories face additional barriers to social sustainability (Silvestre, 2015). Furthermore, it was noted that some PsyCap studies took a very instrumental approach to well-being as a route to improved productivity. However, there is evidence that Chinese factories incorporate a number of social risks which might be ameliorated by investment in workers' PsyCap. Like few other well-being theories, PsyCap also provided a valid measurement system which had already been used in Chinese factories.

2.4.4. The importance of strong HRM and training

Workers can potentially be a source of competitive advantage to a factory, and Lean might prove a strong vehicle for well-being improvement. Lean aspects mentioned in PsyCap studies as supporting the well-being of workers are training, job complexity and strategic HRM. Without strong HRM, however, Lean has the potential to create an unsupportive work environment. Lean's most important element for social sustainability, HRM oversees job rotation, team working and training, each able to boost workers' motivation (Longoni and Cagliano, 2015). Better HRM could benefit Chinese factories both in their competition for workers and in relation to the social sustainability and social risk management concerns of their clients.

Literature suggests that work values, such as corporate culture and management style, impact both individual and organisational performance (Schein, 1985; Adkins and Russell, 1997; Lee and Yu, 2004; Ma and Trigo, 2008; Ugwu *et al.*, 2016; Oncioiu *et al.*, 2017). They have been positively linked to job satisfaction, commitment, job choice, judgments of person-organisation fit and work performance (Adkins *et al.*, 1994; Adkins and Russell, 1997; Joo *et al.*, 2016; Iqbal *et al.*, 2018; Vong *et al.*, 2018). Distinctive, consistent HRM signals to workers their appropriate responses but conditions required include all managers' willingness and ability to know, understand, and implement HRM strategies (Bowen and Ostroff, 2004; Adler *et al.*, 2017). Ineffectual HRM can leave a business open to costly staff turnover and negative stakeholder evaluations.

HRM systems are developed in various climates, including the *psychological climate* which is defined as how workers make sense of their environment, their tasks and the management's expectations (Bowen and Ostroff, 2004). Lean's focus on manufacturing goals, including task requirements, task accomplishment and goal development, often requires support, achievement-acknowledgement and positive feedback from supervisors (Raibley, 2012).

Workplace well-being resources can offset the stresses of job demands (Vegchel *et al.*, 2005). Motivating workers in factories where they often work long hours may require extra resources including psychological support. Luthans and Avey (2008) have argued for Chinese businesses to update their HRM, asserting that improving working conditions, as well as having productivity benefits, can also support mental health and decrease staff turnover (Adler *et al.*, 2017).

Positive people-management encourages the strengths of workers, while negative approaches correct behaviour (Luthans, 2002a). Each has its pitfalls, with excessive optimism leading to

irresponsibility and poor resource-allocation, while less-effective individuals are prone to fail when criticised (Luthans and Youssef, 2007; Luthans *et al*., 2008). Ideal HRM would balance positive and negative psychological approaches (Luthans and Youssef, 2007). Self-efficacy can be developed through 'mastery experiences and vicarious learning' (Luthans and Youssef, 2007). Its implementation with motivational teamwork can allow for positive production outcomes, and may prevent the frequent turnover that drains training budgets (Luthans *et al*., 2008; Distelhorst *et al*., 2016; Helleno *et al*., 2017; Adler *et al*., 2017). Necessary conditions would include policies congruent with workers' preferences, and line leaders trained to understand and implement them. Workers would also require training allowing them to understand any organisational changes (Adler *et al*., 2017).

One obstacle to the positive psychological and social capital of factory workers, and therefore to their well-being, is miscommunication with management, who 'may not be fully aware of the value that workers place on different workplace amenities' (Adler *et al*., 2017). Adler (2017) has suggested that while factory workers are primarily concerned about abuse – including sexual harassment – and air quality, managers think they care most about workplace temperature and the potential for injuries. This disconnect might be addressed through HRM that facilitates training for managers and allows workers to have a voice. Involving workers in identifying and solving problems in the workplace could lead them to become more involved, engaged and committed to the business. Konrad and Mangel (2000) use an *exchange framework* to explain the underlying mechanism, which goes beyond work-for-pay (Tsui *et al*., 1997; Cegarra-Leiva *et al*., 2012). Investments in mutual trust and commitment may be rewarded by greater effort from workers (Konrad and Mangel, 2000; Rubin *et al*., 2010; Walumbwa *et al*., 2011; Ugwu *et al*., 2016). More committed workers show greater work effectiveness, more organisational citizenship behaviour and less absence and attrition (Williams and Anderson, 1991; Redman and Snape, 2005; Wong and Wong, 2017). By contrast, management that does not include trust or positive psychology is likely to alienate and demotivate workers.

HRM theory, a key part of Lean, emphasises a respect for the worker that may be missing in many factories and is rarely considered by monitoring regimes (Longoni *et al*., 2013; Longoni and Cagliano, 2015). Psychological resilience is important in stressful environments like factories. Uncertainty of job location or daily task can reduce a worker's ability to plan (Fletcher and Sarkar, 2013). Acedo and Barroso (2006), as part of a resource-based theory, have described a factory transforming engagement among its workers by involving them in decision-making, giving them a voice. Birdi saw improved worker-manager communication

motivating workers to 'work harder and more flexibly' (Hackman and Oldham, 1976; Birdi *et al.,* 2008). It encourages *thinking big,* initiative and practical engagement, which reduces supervision costs (Frese *et al*., 1996; Parker *et al*., 2001; Birdi *et al*., 2008; Frese, 2008). Training line leaders to improve communication could therefore improve workers' commitment. Better work relationships with managers at all levels in their factory could help workers to build their social capital and to increase their psychological resilience through support networks (Liang, 2015).

Training is important to everyone in a Lean system, since everyone must understand and implement the Lean philosophy (Worley and Doolen, 2015; Alhuraish *et al*., 2017). Both workers and factories would benefit from investment in worker training and other support measures. Successful training can both increase a worker's PsyCap through building self-efficacy, and help to orient them in the business (Luthans and Youssef, 2007). Skills training would allow Chinese factory workers to complete their tasks more quickly while not becoming demotivated by failures. Brown and O'Rourke (2007) mention 'the development of informed, empowered, and active workers, with the knowledge, skills and opportunities to act in the workplace to eliminate or reduce hazards' as key to safety within Lean. The literature had begun to suggest that social risk management might be improved through training workers.

Training has been used to improve occupational health and safety in factories, reducing the need for some audits or inspections (Yeow and Sen, 2003; Yu *et al*., 2013; Aghilinejad *et al*., 2015; Liu and Yang, 2018). Yu and Yu (2013) found evidence of early, long-term and consistent participatory training helping to prevent MSDs among factory workers. Workers' consequent desire to work in a safer, healthier environment improved their performance (Coelli *et al*., 2005). Training can also empower workers. Tang (2016) found 66.8% of Chinese workers unaware of legal overtime rates or premiums. Teaching them their rights is a popular intervention (Sendlhofer and Lernborg, 2018). Digital training is used to teach health and safety, workplace dialogue and employment policies (Barrie, 2016). Software such as Quizrr (https://www.quizrr.se) is used to educate garment workers in China and Bangladesh on their rights and responsibilities. De Vin and Jacobsson (2017) found realistic game-based simulations able to successfully train workers in Lean standards and techniques, allowing them to make and learn from mistakes without impacting shop-floor quality (Ozelkan *et al*., 2007; Tetteh and McWilliams, 2010). Suppliers can implement digital training at any time, and collect and share results with clients in a way that avoids some of the difficulties with factory audits (Barrie, 2016).

Not all training is effective, however. Fewer than half the factory workers studied by Adler and Brown (2017) reported having received training in anything more than basic manufacturing skills, suggesting incentives and pay structure were not included. Their managers reported higher levels of worker skills training than the workers did (Adler *et al*., 2017). Investments in workers' training are likely to increase productivity throughout a factory, as are decreased hour expectations (Akhtar *et al*., 2008; Cobb, 2013; Helleno *et al*., 2017). Whether or not training, job-related or otherwise, can lead to performance improvement by helping workers to feel more valued, still needs to be tested (Guan and Frenkel, 2018).

Reviewing the literature confirmed a fundamental disconnect between the theory on social sustainability in global supply chains and those most affected – the factory workers. Improved management has been shown to improve the well-being of workers, and evidence suggests this may improve a factory's performance, yet well-being is not considered by the social risk management or SSCM literature, or evaluated as part of the monitoring done by businesses. To improve management would require training in a positive and supportive management style. Social capital could be important for workers' well-being, and good relationships in factories with both managers and colleagues can help workers to build social capital and increase their psychological resilience and ability to bounce back from failures or negative situations (Luthans *et al*., 2008). Self-efficacy can be learned by workers through positive accomplishment experiences, which would require investment in their training. Unfortunately, the social sustainability discussion has tended to focus on audits and other initiatives implemented by large western businesses for reputation-risk management, rather than initiatives that might start to improve the well-being of workers.

2.4.4.1. Work skills training

Training is seen throughout the literature as a vital approach to resource management in factories (Longoni *et al*., 2014; Longoni and Cagliano, 2015). Job-specific training, continuing education and developmental skills training for workers each have a positive relationship with all aspects of PsyCap, and with self-efficacy in particular (Earley, 1994; Luthans *et al*., 2013; Guan and Frenkel, 2018).

Task- or job-related training has long been a best-practice of strategic HRM and high-performance work systems (Lawler, 1986; Arthur, 1994; Pfeffer and Veiga, 1999; Khilji and Wang, 2006). Skills training increases flexibility, agile thinking, productivity and problem-solving within Lean (Ichimura *et al*., 2008; Alves *et al*., 2012; Worley and Doolen, 2015). Training and support for skills development gives workers self-esteem and a sense of

mastery, allowing them to better set, adapt to, and implement goals. It contributes to task-completion through self-efficacy, hope, optimism and the resilience to cope with negative feedback (Johannessen *et al*., 2017). Training can develop a worker's self-efficacy through observational learning, verbal persuasion, enactive mastery and physiological or psychological arousal (Bedi *et al*., 2016). A worker may become absorbed, immersing their body and intellect in a task and developing a sense of identity from a role (Kojima, 2015). Training allowing them to understand this process would be likely to help to deepen their interest in, and commitment to, excellence (Alves *et al*., 2012; Kojima, 2015). If workers were included as stakeholders in the theoretical model of supply chain relationships their self-efficacy, optimism, resilience and hope might be seen as drivers of social sustainability and training as a potential enabler of these (see Figure 4 on page 44, above).

Chinese society has historically emphasised social interests, collective action and shared responsibility. Group-focused training that educates production-line workers about their role in production, connecting them to a shared accomplishment, is therefore potentially more effective (Earley, 1994). Moretti (2004) has shown education having a spill-over effect through social modelling, increasing the productivity of all workers. This can contribute to cohesion as workers help each other to learn. Teaching another helps a worker to feel valued.

Furthermore, social boundaries, including prejudices to do with education, articulacy, dialect and personal identification with place of origin, can be broken down with training. Task-oriented training for production-line workers could be used to improve their self-efficacy and optimism (Jacka, 2014; Zhan, 2011). Training their line leaders to set goals and be more supportive might help the workers to develop resilience and hope. Ranganathan (2017) saw training as particularly important for first-time workers, since learning from an experienced worker can also convey indirect work skills such as self-representation, interpersonal communication, work-life separation and self-reliance, resulting in decreased turnover. The development of integrative training procedures and HRM in developing countries might be expected to help to decrease turnover and increase productivity (Luthans *et al*., 2008; Adler *et al*., 2017).

Factory workers identify training and skills development as desirable, since upgrading factories are likely to reward highly-skilled workers with increased incentives and benefits (Rossi, 2013). 'Most migrant workers would like, given the opportunity, to participate in training programmes to improve their skills' (Zhan, 2011). New skills can also allow a worker to pursue their personal ambitions, thereby supporting their eudaimonic well-being (Zhigang and Lin, 2013). Mavrikios and Papakostas (2013) have argued for technological education. As

manufacturing embraces machine-learning, workers hired as assembly-line operatives will require the skills and education both to operate high-tech automated equipment and to problem-solve new-process implementation (Reuter *et al*., 2017). Training helping a factory's workers to become *knowledge workers* would confer a competitive advantage on both that factory and its individuals (Mavrikios *et al*., 2013; Kang *et al*., 2016; Matt *et al*., 2018).

2.4.4.2. Supervision training

Skills training as an intervention can backfire if the trainer is short-tempered or unwilling to explain new concepts to full comprehension (Kojima, 2015). The ability of Lean to positively influence the well-being of workers is contingent on positive management practices (Cullinane *et al*., 2012; Nogueira *et al*., 2018).

Self-esteem can easily deteriorate where workers are treated like interchangeable machine parts with no possibility of personal career development (Lefkowitz, 1967). Resilience develops from positive qualities such as an easy temperament, self-esteem and planning skills, but this can only happen within a supportive environment (Cai *et al*., 2015; Sarkar and Fletcher, 2014). Sein and Howteerakul (2010) found insufficient supervisor social support to be among the top two factors contributing to factory job strain. While Adler and Brown (2017) found that more than 75% of workers said they were comfortable seeking help from a supervisor, only half said they felt treated fairly or respected when corrected by a supervisor. 63% had noticed that their supervisors did not always follow the rules of their factory. Leblebici (2012) found 100% of workers *strongly agreed* that relations with their supervisor affected their productivity.

Chinese factories face a number of social risks that could potentially be ameliorated by investment in management training. Siu (2017) reports that the supervision style in these factories still typically relies on negative psychological motivation. Lean can offer managerial practices that empower workers by emphasising the development of competitive skills (Moori *et al*., 2013; Poksinska *et al*., 2013; Nogueira *et al*., 2018). Positive training could then strengthen workers' performance, rendering coercive measures unnecessary (Luthans and Youssef, 2007; Siu, 2017).

Based on this literature, training as an intervention would be expected to support interpersonal performance feedback by line leaders, potentially facilitating career progression, as well as enabling workers to better perform their daily tasks. This would require testing in a Chinese factory as it has not been widely studied in that context. Training their line leaders might improve the social well-being of workers by improving their workplace relationships. Skills

training appeared to have the potential to improve workers' self-efficacy and optimism in particular, and sharing their learning with others could help them to feel valued.

2.5. Literature overview and research questions

The wide and complex range of literature reviewed in this two-stage literature review uncovered a series of problems (Alvesson and Sandberg, 2011). These would inform the development of the two research questions.

Remote manufacturing in developing countries was seen to have led to pressure on businesses to provide transparency into their supply chains and to manage social risks, a process which could easily become over-focused on PR concerns. A model by Köksal and Strähle (2017) showed relationships with stakeholders as important, but did not consider workers as stakeholders, reflecting the first identified problem, a more general tendency to leave them out of the debate.

Risk management has generated multiple factory monitoring schemes, all susceptible to auditor bias and with no single set of global standards. The supply-chain literature therefore next indicated a problem comprising the inability of audits to provide workable data for buyers, stakeholders or factory managers. Social sustainability was defined as dependent on the well-being of factory workers. While there was some agreement that this should be monitored, audits are unsuitable for such a complex phenomenon.

A third problem is that psychological well-being at work is still being defined by academics. There is little clarity in the literature on what could be measured. As concerns about impacts on physical safety and health are increasingly addressed, the focus of positive psychology has shifted away from hedonic factors such as workstation comfort and eudaimonic and social well-being aspects are receiving more attention.

Little of the well-being literature found considered Chinese factory workers at all, however. Studies led by Luthans (2005; 2008) linking their PsyCap to work performance, had failed to consider their opinions. A fourth problem was the need to investigate barriers to the well-being of these specific workers. This would require more than snapshots. A longitudinal method was needed which would allow the researcher to hear as accurately as possible direct from the workers.

This literature had indicated the importance of HRM and of management styles focused on positive attributes like those comprising PsyCap, but in Chinese factories this would require training for the managers. Training both workers and their line leaders could potentially

improve worker retention, absenteeism and turnover. A fifth problem was that the effectiveness of this in Chinese factories had not been tested.

The problems revealed are summarised below:

- Self-regulation in global supply chains and relationship-management from a Western viewpoint have left out both the well-being and perspectives of factory workers.
- Current audit-based methods can fail to protect workers and would be unsuitable for monitoring well-being. Few evaluative theories from literature incorporate an ability to assess workers' well-being or indicate changes to management processes which might improve it.
- Academics and businesses lack an understanding of the well-being of Chinese factory workers. Conflicting narratives are seen in both media and research.
- The lack of successful similar research and relevant theory development meant a new longitudinal approach would be required for appropriate data-gathering.
- The effects of training for workers and their line leaders on the well-being of those workers required testing in Chinese factories.

This led to the first research question:

Q1: What are the factors that influence well-being for Chinese factory workers?

Having established the importance of PsyCap to the well-being which drives social sustainability, and of the potential practical value of Lean and the importance of HRM in this, it would be necessary to persuade businesses of the value of making changes. The ethical responsibility to workers may not, alone, be motivating enough. Evidence of improved factory performance or reduced worker attrition was a more likely spur.

This led to a second research question:

Q2: How does workers' well-being influence factory performance?

Chapter 3. Research design

The following chapter describes the methods used to answer the two research questions concluding the previous chapter. It introduces the philosophy and principles underlying the research approach and the overall architecture of the research. The third and fourth sections describe each of two research phases, a pilot and a main study, explaining the choice of data-gathering method, its design and implementation and the analytical methods used. These are followed by a short commentary on the ethical considerations of working so closely with human subjects and some insights on the methods and their limitations.

3.1. Fundamental beliefs

3.1.1. Context and aims

Current data-collection methods are providing little insight into the well-being of Chinese factory workers or their feelings about their working conditions (Hakemulder, 2015). Both businesses and academics have been stymied by a lack of accurate information (Locke *et al.*, 2009; Egels-Zandén *et al.*, 2015; Köksal *et al.*, 2017). While academics have largely focused on creating an ethical framework to encourage social as well as environmental sustainability in supply chains, factory social audits typically consider physical workplace conditions and fail to extend this into the broader quality of workers' lives (Beamon, 2005; Manners-Bell, 2017). The lack of any agreed, standardised criteria for measuring well-being makes it difficult to evaluate that of the workers in a global supply chain (Locke, 2013). Factory audits, the traditional monitoring method, had been seen in the literature to lack the ability to gather transparent information about workers.

This research had two main aims: the first was to understand the well-being of the workers in Chinese factories. The second was to understand if their well-being is related to factory performance. Some practical well-being interventions were tested in factories and the opportunity was taken to consider any measurable connection between improved well-being and a factory's performance. The failure of existing research methods to successfully address these questions added a third aim, which was to develop a new method for researching the situation for these workers. The hope was to discover a method which could be used effectively in this challenging environment to hear from workers themselves. Successfully addressing all these aims would add value for industry as well as for academia.

3.1.2. Research Approach

3.1.2.1. Research philosophy

Many academic fields have established their own ontological and epistemological conventions. However, although there is substantial literature on factories and their workers, the existing theory is fragmented and there is a knowledge lacuna around workers and their well-being, particularly in factories in China. This research set out to understand the real daily impacts on the well-being of these workers.

As revealed in the previous chapter, researching in Chinese factories is difficult. They may be overcrowded or noisy and factors impacting their workers' well-being can also undermine data collection. To truly understand a worker's well-being would involve enquiring about personal matters about which they may struggle to be honest if asked face-to-face at work. The research philosophy and design was therefore rooted in the fact that factories are not ideal research environments.

This research adopted an interpretivist, epistemological philosophical approach to capturing information. Interpretivism was chosen because well-being is essentially subjective, and can only really be understood from the point of view of the individual (Gasper, 2010). Previous research had been undermined by methodological failures or by attempts to apply a positivist approach to a phenomenon that does not lend itself to easy measurement.

Carson and Gilmore (2001) have described an interpretivist approach which can capture 'meanings in human interaction' and make sense of whatever emerges within a personal and flexible structure (Black, 2006). A researcher accepts that they will have some prior insight into the context but assumes a fixed research design would be inappropriate because that which is perceived as reality can be multifarious, complex and unpredictable in nature (Hudson and Ozanne, 1988). It is essential for an 'interpretivist researcher to understand motivations, reasons and other subjective experiences' (Hudson and Ozanne, 1988; Neuman, 2000). 'People adapt, and no one can gain prior knowledge of a time- and context-bound social reality' (Hudson and Ozanne, 1988). The researcher in this case had already spent much time in factories or evaluating audits of the factories studied, but applied an emergent and collaborative approach, remaining open to new knowledge and allowing the research to develop with the help of the workers themselves.

Although the field research gathered much data, some documenting in detail the day-to-day activities of workers, that was nevertheless limited information. While these two studies helped to form a fuller picture of conditions in a factory, it is also true that the researcher

operated from a position of incomplete knowledge. Conclusions reached by the inductive method are not necessarily inclusive (Thagard and Shelley, 1997). There is no way to know that all possible evidence has been gathered, and that no unobserved evidence would invalidate a hypothesis.

The ontological approach was constructionist, again in response to the subject matter. Constructionism asserts that 'social phenomena and their meanings are continually being accomplished by social actors' – in the case of this research, Chinese factory workers (Bryman, 2012). The philosophical approach is grounded in their experiences.

3.1.2.2. Research principles

The objective of this research was to understand the nature of a specific problem which had not been well-described in literature or illuminated using traditional monitoring approaches. Both in the theory and in industry benchmarking, Chinese factory workers had been omitted from discussions of their own well-being. Although they are both most affected by their working conditions and in the best position to provide insights, little research had engaged with them directly. The main research principle was therefore to involve these workers as active participants by hearing direct from them and exploring their working conditions from their own perspectives. Workers were therefore involved from an early stage to allow for a better understanding of their concerns.

Literature had shown that traditional research using surveys or interviews echoed the limitations seen in the audit-based approaches to monitoring, in that both rely on the periodic snapshot. Another principle to emerge was that the data should be longitudinal, ideally gathered over a substantial period, and in *real time*, allowing workers both to report incidents immediately, avoiding recall bias, and to choose the environment in which to supply what might be very personal information.

3.2. Overall research architecture – a two-phase project

The research required the researcher to be able to hear direct from the workers in some Chinese factories. As discussed in the literature review, attempts to gather accurate data about their well-being face cultural, methodological and communication issues. A method was required which could bridge that gap.

The research comprised two phases: a pilot and the main study. The short digital diary pilot was conducted at one factory in 2017 and a full-scale, 12-month study at four factories began

in 2019. This main study included action research testing interventions to improve the well-being of workers. Table 6, below, shows these two phases.

Table 6: Research timeline of the two diary studies

	2017 pilot study	**2019 main study**
Start date	20 September 2017	19 January 2019
End date	27 December 2017	19 January 2020
Number of factories	1	4*
Number of participating workers	82	466
Number of diary entries collected	1,920	16,390
Meeting date 1	13 October 2017	24 April 2019
Meeting date 2	14 December 2017	15 May 2019
Meeting date 3	-	13 August 2019
Meeting date 4	-	2 January 2020
Intervention start date	No interventions	23 May 2019
Intervention end date	No interventions	6 July 2019

* Five factories agreed to participate in the main study, but one had to drop out

The research would apply an inductive method: gathering evidence, seeking patterns, and forming hypotheses before proceeding to a generalised conclusion due to accumulated data. Due to its sensitive nature, workers were consulted on the method throughout. This was built into the research design in the form of meetings with the participants.

A short pilot was conducted at a single factory to test digital diaries as a method while allowing for some initial insights into the well-being of workers. Although the studies used similar data-collection methods, learnings from the pilot would inform the design of the main study.

This more dynamic main study was designed based on insights from both pilot and literature. It used workers' digital voice diaries to gather longitudinal data in four factories between January 2019 and January 2020. (Five factories had begun the study but one had dropped out after a fire on site halted production.) Action research was included in the form of practical interventions to improve the well-being of the workers. Designed based on learnings from the literature and early insights from the pilot and pre-intervention main-study diaries, these were tested with diary data used to assess any impacts. Factory-level performance metrics were then considered to identify any influences on factory performance or related factors like worker retention. The figure below shows the overall research outline of the two studies.
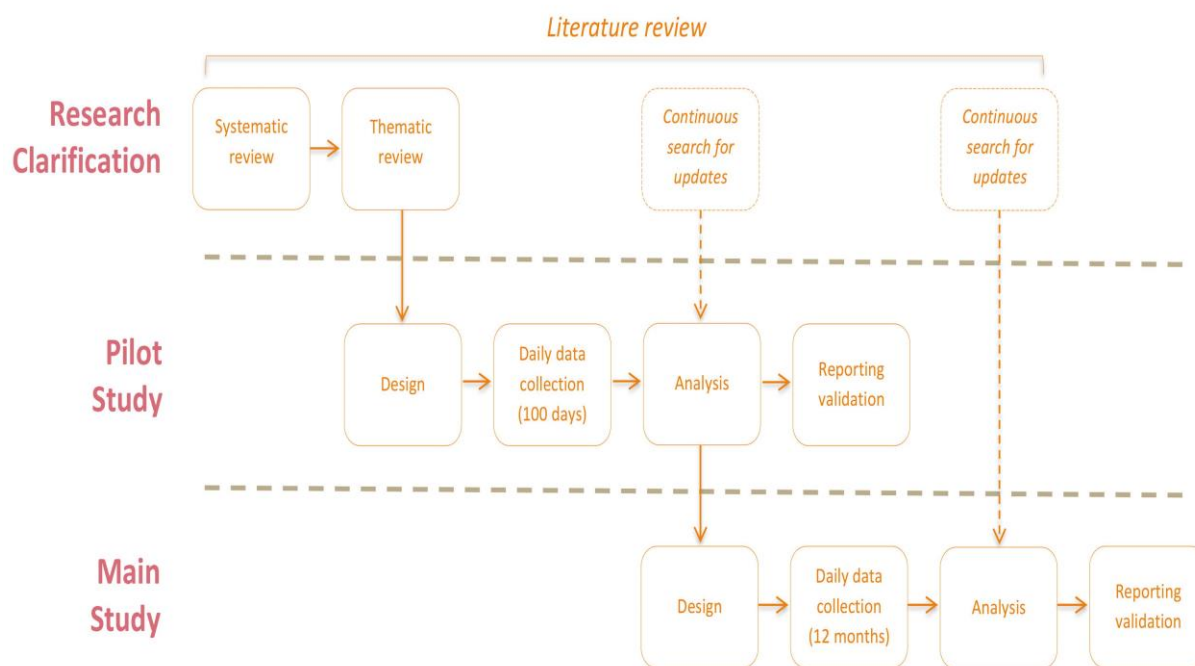
Answering the two research questions was the main objective of the research as a whole, and each study had distinct objectives and expected outputs. The first, the pilot, while primarily testing a proposed method, also set out to identify emerging concepts and themes, starting to address the first research question: *What are the factors that influence well-being for Chinese factory workers?* The main study then used those findings with the more substantial data from its pre-intervention data-collection stage to answer that question.

The next stage of the main study involved the action research. Impacts of interventions were assessed by comparing workers' pre- and post-intervention sentiment and concerns as observed in their diaries. Each factory's performance, as seen in its own metrics, was similarly compared, to answer the second research question: *How does workers' well-being influence factory performance?* Table 7, below, shows the scale and duration of each study, with expected outputs.

Table 7: Objectives and outputs for each study

Phase	Objective	Scale	Outputs
Phase one – pilot diary study	Test new longitudinal research method and start to understand the situation for workers in factories	1,920 digital diary entries, collected from a group of 82 workers at one factory over 100 days	Insights for improving and scaling the method A small dataset suggesting potential concepts and themes A data structure
Phase two – large-scale diary study with interventions	Implement diary method across multiple factories for a long period. Develop findings from phase one at scale Develop a theoretical model and hypotheses Design interventions Test outcomes of interventions by analysing workers' diaries Consider the results in the context of factory performance	16,390 diary entries collected from 466 workers across four factories over 12 months Two interventions both implemented in two factories (with two control factories) Monthly collection of performance and worker-retention metrics from each factory	Substantial data allowing for more complex analysis, answering the first research question Refined data structure A theoretical model showing factors affecting workers and their well-being Interventions shown to improve workers' well-being Insights into any impacts on factory performance metrics, to answer the second research question

The next section describes these methods, how they were chosen and implemented, the data produced and how it was analysed.

3.3. Research design for phase one – the pilot diary study

3.3.1. The need for an innovative method

Chinese factories can be noisy and sometimes overcrowded or chaotic. Their workers tend to assume anyone asking them questions is an auditor. There are cultural and language barriers. There was little found in the literature describing methods successfully used to gather data direct from workers in this context, and previous attempts by the researcher using surveys had served only to highlight their inadequacy in this environment. Reflecting on those surveys proved useful to the research design in highlighting some specific challenges.

Three successive Qualtrics surveys, in 2016 and 2017, had used QR-code handouts in factories to invite workers to contribute online using their smartphones. Only 18 of the 100 factories invited had agreed to allow their workers to participate. Successive attempts to evolve the method failed to show promise. In the first, many fields were left blank. Discussions with management revealed that workers had struggled to understand the questions. A simplified, shortened questionnaire faced data integrity issues, with two factories

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found to be *gaming* the results. Although an overall total of 13,824 workers would respond, the third attempt seemed to confirm that management saw the research as a test they needed their workers to pass.

Perhaps the most significant limitation of surveys to emerge from this exercise was their tendency to only ask about previously identified issues. For the most part, workers were asked whether or not *X* was an issue for them. Multiple-choice questions could not produce the new insights required. Some voluntary follow-up interviews suggested that research was a new experience for these workers. Being interviewed appeared to provoke anxiety and resistance. A few of the survey questions were open, inviting free-fill answers. While not producing a useful volume of data, these provided a glimpse of the potential in allowing workers to offer their own observations.

Well-being is a cumulative, ongoing process. A survey or interview fails to reflect whether or not that day was typical, or to track changes over time. Results are also limited by participants' memories, because people are more likely to recall the unusual than the routine. It is in the routine that opportunities for improvement may lie. Longitudinal data would provide a better understanding of factory conditions (Egels-Zandén, 2014). It was apparent that any attempt to gather well-being information direct from workers would require a method which helped them to feel safe enough to share openly and often.

Babbie and Halley (2007) identify social-science research as exploratory, descriptive or explanatory, indicating that: 'exploratory research is used when the topic or issue is new and when data is difficult to collect'. It can 'gather preliminary information that will help define problems and suggest hypotheses' (Kotler and Pfoertsch, 2006; Shields and Rangarajan, 2013). It is used to establish priorities and to develop operational definitions (Shields and Rangarajan, 2013). The results, alone not likely to provide a basis for decision-making, can nevertheless allow for significant insights. The pilot diary study, while primarily testing the method, also sought 'to investigate social phenomena without explicit expectations' (Check and Schutt, 2012).

There had been previous studies of the everyday lives of Chinese factory workers. Siu (2015), for example, conducted ethnographic research through proximity to, and friendships with, factory workers across twenty years. Its component personal accounts, while they collectively convey a vivid sense of changing working conditions and of the influences of a factory on its migrant workers, cannot be standardised. This makes the qualitative data an insufficient basis for actions to develop social sustainability (Siu, 2015). An aim of this research was to gather current information of that quality and depth in a more structured form. It would not be

possible to directly experience the daily life of a migrant factory worker or to spend a long period observing their lives in a Chinese factory. A method was required which could allow for remote systematic real-time data capture while avoiding triggering anxiety by being intrusive.

3.3.2. The benefits of diary research

Diaries have always offered deep insights into people's lives. Also known as *experience sampling* or *ecological momentary assessment*, diary research involves participants recording their experiences in a diary (Alaszewski, 2006). Diaries are self-report instruments which 'offer the opportunity to investigate social, psychological and physiological processes within everyday situations' and to 'examine ongoing experiences' (Bolger *et al*., 2003). They can collect qualitative information about an activity or experience in real time, providing 'a substitute for accurate scientific observation, in settings from which the scientist is absent' (Elliott, 1997).

The key features of a diary method are:

Longitudinal data: Existing studies of Chinese factory workers have tended to be based on data extracted at a single point in time. Unlike many other data-collection methods, diaries are by definition longitudinal. They can help to record and reconstruct events (Nicholl, 2010). Diaries are often used with medical patients whose condition is expected to change over time, to understand the development of an illness and the process of recovery (Nicholl, 2010).

Close to real time: While interviews rely on remembered incidents, diaries can supply information on current experiences. Interviews may discuss events from a far-removed past. Frequent diary entries limit the hindsight. Allowing reporting close to real time can minimise retrospective recall error (Reid *et al*., 2009; Sternfeld *et al*., 2011).

Confidentiality: Because diary-keeping does not involve direct interaction with a researcher, subjects may find it easier to share sensitive data. Diaries are used in healthcare settings for such reasons. Factory workers may speak often to social-compliance auditors while fearing repercussions if they share negative information. When interviewed they can be nervous. Such individuals may find it easier to use a diary. Gibson and Hibbins (2016) found 'studying *at a distance*' actually allowed them to 'enter more fully the world of young people'.

Hard-to-reach populations: Hard-to-reach populations are those requiring sensitive research methods because of stigmatisation. Also sometimes known as *hidden populations*, they can be difficult to access through traditional survey methods (Muhib *et al*., 2001). Diaries may allow more subjects to participate in a study first-hand (Bartlett, 2012).

Therapeutic value: Regular reflection has an impact on the diarist. Subjects in a study of the carers of Alzheimer's patients found keeping a diary therapeutic and enjoyable (Välimäki *et al.*, 2007). Bartlett (2012) found it to be edifying to a patient's identity and sense of self.

Low cost: By providing remote access to the population studied, diaries can offer a vast amount of information while avoiding the cost of an extensive field study (Palen and Salzman, 2002; Bolger *et al.*, 2003).

All these features can make diary research an effective way 'to capture rich insights into processes, relationships and settings' (Patterson, 2005). Earlier studies had used diaries in workplaces to investigate emotions, social interactions and work-life conflict (Tschan *et al.*, 2005; Bono *et al.*, 2007; Ilies *et al.*, 2007; Jones *et al.*, 2007; Sonnentag *et al.*, 2008). This pilot set out to test their potential to provide a more useful understanding of conditions in a Chinese factory.

3.3.3. The benefits of digital data collection

Paper diaries can be challenging to use and to transmit, and inefficient to digitalise. New technologies, on the other hand, have the potential to simplify both data-collection and analysis. Methods now available include text, voice and video recording.

Closer to real time: Digital technologies have brought diary-keeping even closer to real time. Diarists may forget to write when agreed, then do it the next day, introducing memory bias which would be hidden in a paper record. Hensel and Fortenberry (2012) have emphasised the ability of the subject to 'self-administer […] in their own environment, as close to the occurrence […] as possible' as a strength of digital self-report. Jacob and Stinson (2012) found smartphone diaries to have higher rates of completion than paper diaries.

Electronic methods can also move the analysis closer to the events recorded. With paper diaries a researcher needs to receive the diary, usually when the study has ended, before commencing analysis; e-diaries make daily data immediately available. Using digital diaries would allow for remote daily data collection, making it possible to analyse immediately and respond to any evident problems as they arose.

More inclusive: Written diaries are only useful with relatively literate populations. In some cases, a diary method is not feasible because the required participants are unable to use the technology. Using popular new technologies such as smartphones with alternative data types can improve inclusion, both facilitating research access and offering subjects more control over their own representation (Murray, 2014; Kayrouz *et al.*, 2016). This research collected diary entries as voice messages, allowing workers unable to read or write to participate.

3.3.4. Why conduct a pilot?

'Pilots are small-scale research projects conducted before the final, full-scale study' (Ismail *et al*., 2018). A digital diary method seemed to offer a good fit with both factory conditions and the overall aims and principles of this research. Since the research tool, method and process had not previously been used in Chinese factories, it was judged useful to test and potentially evolve these before embarking on a substantial study across multiple sites. A pilot was conducted both to support the design of the method and to help to create a more definitive investigation (Shields and Rangarajan, 2013; Bryman and Bell, 2018). There were many unknown factors, including whether or not diaries would prove culturally appropriate, and it provided a chance to assess the time and resources which would be required.

3.3.5. Diary pilot design

A novel approach to data collection combining traditional diary research with social media would be piloted. Planning the method required a series of deliberate design decisions (Snowden, 2015). The elected approach is outlined below.

Sample: The study was advertised in the factory, inviting all its workers to volunteer, producing a self-selecting sample. Volunteers were interviewed face-to-face to ensure the sample actually represented the factory's worker population.

Duration: It was elected to run the pilot for 100-days, from September 2017. The study would therefore end before the usual 30-day rush leading up to the Chinese New Year holiday.

Technology: WeChat (Chinese: 微信; literally: *micro-message*), a Chinese multi-purpose social media application, was used to capture workers' daily voice messages. WeChat was chosen because it is the most popular method of communication, shopping and information-sharing in China. Used by all ages and all demographics, it is among the largest stand-alone smartphone applications, and has more than a billion monthly active users. It allows users to create communities, post information and send messages, including voice messages. Its built-in instant translation tool allows an English-speaker to chat to someone speaking one of China's many languages. Like similar platforms, it is censored and monitored in China.

Protocol: Workers were asked to leave a daily voice message sharing what had made them happy or unhappy that day, or anything else they wanted to share about their well-being. Voice messages were selected for ease of use and to avoid excluding workers with limited literacy. A variable rather than a fixed or event-based schedule was selected, to allow workers the flexibility to report in when it was most convenient or private. Privacy was a particular concern as most were sharing dormitories with colleagues. It was also felt that a fixed

schedule may have sensitised some workers to stress due to the anticipation of reporting times, and that reporting routines might become intrusive during busy work times. Workers were, however, asked to contribute daily even during holidays and days off, both for continuity and in the hope that keeping their diary would become a normal ritual, leading to more open and useful content.

Data collection and management: Voice messages from workers would be output daily as text transcriptions, translated into English using WeChat's built-in features, downloaded, captured in Excel and saved. The translation would be checked using Google Translate, then read, by volunteers from a Chinese workers' rights NGO who had agreed to consult on the research, to confirm sense and capture a sentiment. The application used to handle the diaries is not linked to telephone numbers so it would be possible to keep them completely anonymous.

3.3.6. Diary pilot implementation

Recruiting and engaging participants: The owners and management of the factory had agreed to provide full access and to the publication of the research findings. A campaign in the factory promoted the study by offering workers life-skills training. Before launch, the idea was tested at a forum with 50 workers, to gauge reactions, gather feedback and assess its feasibility. NGO volunteers attended to help to broach cultural divisions and to unlock the discussion. Some of the workers at this factory spoke local dialects, so translators also attended. These workers were amazed that their lives were of interest, and almost shocked that they might be asked about their feelings. They only expected such enquiries from their mother or a grandmother or teacher. Role-play was used to help them to become more comfortable with the idea.

Interested workers were then invited to meet the researcher in the factory during a work day. Lunch was provided and talk about food used as an ice-breaker. Participants were recruited. All were volunteers and provided informed consent. 100 signed up on the day the pilot was launched, more than had been anticipated. All had access to smartphones and could leave voice messages. Each was interviewed to validate the sample, allowing the researcher to also learn about their education level, marital status, family situation, etc. Many were migrants: 91% were working outside their province of origin, with the remaining 9% from elsewhere in the factory's province. 68% had children (typically living with family in their hometown), and 66% were aged under 30. This information was documented to allow for additional validation when the diaries were analysed, if a worker mentioned their children, for example.

Table 8: Demographic profile of pilot participants

Demographic	Frequency (n=82)	Percentage
Gender		
Male	46	56%
Female	36	44%
Education level		
College	2	2%
Senior high school	7	9%
Junior high school	72	88%
Primary school	1	1%
Age		
18 - 20	26	32%
21 - 30	28	34%
31 - 40	20	24%
41 - 50	8	10%
Marital status		
Married	42	51%
Single	40	49%
Have children		
Yes	49	68%
No	33	32%
Number of children		
0	33	40%
1	23	28%
2	25	30%
3	1	2%

Collecting the data: The 100 volunteers were asked to start leaving voice messages. It quickly became apparent that they did not understand what type of content would be useful. For example, during the first 20 days of the pilot, some entries comprised only emojis. 74% of messages collected during this time proved to be about love interests in the factory or the food they ate. Workers also shared about the weather, food they planned to buy or similar topics (12.5%), leaving only 13.5% of those entries relevant to their work in the factory.

Treating those first 20 days as a trial, the pilot was re-launched for another 100 days, with more examples, role-play and discussion. During those 100 days a relatively large number of voice messages was collected. 40% of those messages related to workers' day-to-day

experiences, such as what they ate for lunch or the weather. While this sometimes allowed for fascinating insights into the daily life of a Chinese migrant factory worker, the focus for the pilot findings was the 60% of messages related to their workplace. This is not because the other subject categories are unimportant; rather, it is because management can do very little to influence the personal lives of workers, while there may be concrete steps they could take within the workplace to improve well-being. The findings related to work are, therefore, explored below.

There were monthly check-ins with group training to foster continued engagement. Based on feedback gathered during the validation interviews, trainings were on childcare, personal care and health, cooking and tailoring. A WeChat group was created and became a very active part of the study. There were daily posts for workers to read and comment on, to create a sense of community and keep interest high. Subjects included advice on personal care, nutrition, yoga or health, motivational messages and general interest topics. 33 workers would remain active, leaving daily voice messages in their diaries, for the entire study period.

Concluding the project: A closing meeting was held to allow workers to discuss how they felt about the study and what had and had not worked well for them. There were also games and food was provided. Attendance was voluntary and the group conversation covered the diaries and any other subjects they wanted to discuss. This was an opportunity to learn what they had found helpful or challenging and what might need to be changed for the main study.

3.3.7. Pilot data coding and analysis

Voice messages, downloaded and translated daily where possible, were analysed within the principles of grounded theory (Glaser and Strauss, 1967). Entries were coded using open coding followed by axial coding (Strauss and Corbin, 2008). Sentiment, used as a broad indicator of well-being, was simplified into *happy, neutral* (meaning neither happy nor unhappy), *a little down* and *unhappy* and one of these indicators assigned manually to each entry. Data was then organised into a structure comprising first-order concepts, second-order themes and a third level of aggregate dimensions (Corley and Gioia, 2004; Gioia *et al*., 2013). A relatively large number of first-order concepts would reflect the diverse range of topics and emotions discussed.

The pilot was revealing, providing insights about the workers and their situation as well as the proposed digital diary method. This created a foundation for the main, 12-month study.

3.4. Research design for phase two – the main study

3.4.1. Main study design

An expanded method: During the pilot the digital diary method had started to show results. A more dynamic main study, in 2019, therefore scaled the exploration to multiple factories and included many more workers, to achieve a deeper immersion into their well-being. Since a single factory might reveal isolated issues due to management style or factory location, factories in a different province were included.

The three-stage approach was: 1) to use diary data from the pilot and the pre-intervention stage of the main study to develop a theoretical model for improving the well-being of these workers, then to conduct action research by 2) implementing and testing some well-being interventions suggested by those diaries and 3) using workers' sentiment and outlook indicators and factory performance metrics to test hypotheses and answer the second research question. The theoretical model and hypotheses will be discussed in detail in Chapter 4.

As in the pilot, the method was to study factory workers longitudinally using daily digital diaries. New elements were: 1) a considerably extended time frame; 2) the action research element; 3) multiple factories including a control group and 4) monthly factory performance data.

Sample: This main study would be conducted in four factories in China, all producing consumer goods for international brands. All factories had been recruited by the researcher, who already had established relationships with their management. Two were in Tier 1 cities, and two in rural villages. One was the factory that had hosted the 2017 pilot, and some workers from that pilot would participate again.

These factories are all routinely audited, and were chosen because they did not appear to have significant issues such as safety violations or use hazardous materials. This meant the study could focus on the holistic well-being, rather than the basic physical safety, of their workers. Their management understood the research and had agreed to allow workers to participate freely, without any worker-level data or identifying information being shared with them, which ensured a normal operating standard throughout. The value-add for factory management would be insights to help them to improve their efficiency, worker retention and social risk management, and operational-level findings were sometimes shared where they could be helpful in this way.

As for the pilot, the study was advertised in each factory, inviting all its workers to volunteer, producing a self-selecting sample. Again, all participants were volunteers and all volunteers were allowed to participate. Each was interviewed face-to-face at their factory to explain the approach to confidentiality, ensuring they were giving informed consent and that the sample actually represented that factory's worker population.

Study preparation period and regular meetings: The pilot had revealed the importance to data quality of allowing time for workers to understand the research and how to keep their diaries. A 20-day recruitment and preparation stage was therefore scheduled, starting with a session at each factory explaining how to record entries and including some role-play. Monthly group meetings at the factories were initially planned, although due to holidays in China and other logistical constraints, they would not occur with the planned cadence.

Using technology to enhance data collection and management: While WeChat would again be used for entry collection and translation, the role of technology was also further developed with a view to accommodating the greater scale of the main study. These workers would interact with a chat bot via WeChat and their diary entries would be collected using a custom-built integrated system. Workers were also able to complete questionnaires using the chat bot, meaning recruitment could be handled automatically online, allowing them to join the study at any point. The chat bot would translate the diary entry (or survey response) into English text and store it in an online database. The researcher and NGO volunteers could later access the diaries online to audit or analyse them. The chat bot would therefore serve as an intermediary between researcher and workers, enabling bulk communication and streamlining collection to allow for greater data volumes.

Analytics scripts could also be executed online. For example, sentiment had been assigned manually during the pilot. The scale of the main study required a more systematic method which could remain consistent throughout. Using the new technology, this process was therefore automated. The spectrum was again simplified into happy, neutral, a little down and unhappy, and these would be assigned to diary entries based on specific words, using a standard multinomial classification model, the Naïve-Bayes Natural Language Toolkit (NLTK) library in Python. (NLTK is a free open-source platform which allows researchers to build Python programs to process, classify and analyse natural human language text as data.)

Action research: Two complementary interventions would be designed based on the analysis of the work-related diary entries gathered during both the pilot and the pre-intervention stage of this main study. Selected for relevance to as many work-related areas as possible, they

would address two aspects of the work environment where it was judged that intervention might be effective. Practical considerations were manageability for the researcher, cost, and factories' willingness to host them. The researcher was not in a position to implement new factory programmes or to alter management or production processes.

Two aspects of the work environment would be identified where intervention by an outside party (i.e. without requiring any work or investment by factory management) might address the causes of the frustration seen in many of the pre-intervention diaries. Interventions comprising two work-related trainings, one for workers and the other for their line leaders, woud be made in two of the four factories, using the remaining two factories as a control group.

A new data type: The data type new to this main study would be monthly factory performance metrics. To be collected from each factory's management, these would focus on four relatively simple operational measures which are comparable between factories. These would be:

- rework rate (total number of units / reworked units)
- product attrition rate (% of total units discarded [i.e. could not be reworked])
- order delay rate (% of orders failing to ship on the confirmed date)
- worker attrition rate (% of workers who left their jobs).

3.4.2. Main study implementation

Recruiting and engaging diary volunteers: The study was promoted in each factory by offering workers benefits including group training and a WeChat group. These would be made available to everyone in all participating factories. Interested workers were brought together at their factory to gauge their enthusiasm and gain insights into what they might find challenging. The NGO and translators again supported these meetings. Lunch was provided, with chat about food initiating discussion. At the factory which had hosted the pilot, experienced volunteers also helped their colleagues to understand the research by explaining how to leave the voice messages and giving examples of types of diary. Talking about how they felt about participating generated enthusiasm and this was particularly helpful in recruiting new volunteers.

Volunteers were signed up. Validation interviews again ensured each was giving informed consent while also providing a chance to learn about and document each one's education level, marital status and family situation, as well as a general sentiment. A total of 466

workers participated in the main study. This group was broadly demographically similar to the pilot participants, as shown in Table 9, below.

Table 9: Demographic profiles of pilot and main study participants

Demographic	Frequency		Percentage (%)	
	Pilot (n=82)	Main study (n=466)	Pilot	Main study
Gender				
Male	46	193	56%	41%
Female	36	256	44%	55%
Education level				
College	2	34	1%	7%
Senior high school	7	82	9%	18%
Junior high school	72	268	88%	58%
Primary school	1	62	1%	13%
Age				
18 - 20	26	53	32%	11%
21 - 30	28	146	34%	31%
31 - 40	20	148	24%	32%
41 - 50	8	93	10%	20%
Married				
Yes	42	256	51%	57%
No	40	193	49%	43%
Has children				
Yes	49	354	60%	76%
No	33	108	40%	23%
Length of employment				
24 months+	49	183	60%	39%
12 - 24 months	13	87	16%	19%
6 - 12 months	17	73	21%	16%
Less than 6 months	3	100	4%	21%

NB. While all pilot study participants replied to all the demographic questions, not all 466 main study participants elected to reply to every question. This table presents the data collected as proportions of all participants.

55% of the 466 were women, and 76% had children. Most (87%) were migrants separated from their families. Some were from minority religious or ethnic groups or spoke regional dialects. 42% were aged under 30 and 71% had left school at 15. Although not all fully literate, all had access to smartphones. 178 of these workers would remain in the study and actively keep daily diaries over the full 12-month period.

Frequent group meetings were again held throughout. The researcher also visited factories to oversee the introduction of interventions and to validate the factory performance data supplied. One element that differed from the pilot was that many workers wanted to join during the longer study period. Each new volunteer was sent a short electronic survey allowing them to sign up via WeChat, and later interviewed by the researcher during a visit to their factory.

Implementing the interventions: Work-skills training for workers was conducted at two of the factories for two months in June 2019 (see Appendix 5). Supervision training for line leaders, focused on communication skills, was conducted at the same two factories in early July 2019 (see Appendix 6). The workers' training took the form of a daily 10-minute demonstration of that day's production task, which was filmed and shown on TV screens at the production line during work hours. Participants received feedback on their group's performance to show how they were improving. All workers in the *intervention* factories were included in these training sessions.

The supervision training was designed to address an identified lack of supportive communication from line leaders. An external Lean production trainer delivered a training session focused on communication skills and how to use positive reinforcement and recognition to motivate workers. Leaders were taught how to set goals, and to inform their teams about their goals and about the product, showing them how their work would contribute to the broader objectives of their factory. Leaders were also taught how to talk to team members in an encouraging way, without shouting at or berating them.

Table 10: The training interventions

Item	Worker training	Line leader training
Start date	23 May 2019	5 July 2019
End date	6 July 2019	5 July 2019
Frequency	Daily	One-off
Training protocol	A daily session of training tailored to the day's specific task on the production line. 1. *Work skills training* (10 minutes): On each production line the line leader demonstrated how to sew different parts of the bag, for example, or to complete item assembly. Depending on orders, there are new products in production approximately every two days. 2. *Q&A* (5 minutes): If any individual workers had difficulty with a certain task, the line leader then trained each separately. (See Appendix 5 for further details)	An in-depth all-day session. 1. *Benefits of using supportive communication with workers* (30 minutes): Expert explanation of why this type of communication is important and how it can help to improve work performance. 2. *Goal setting* (2 hours): How to set clear goals and deliverables daily and how to communicate those to the team. 3. *Coaching and developing workers* (1 hour): Expert illustration of using communication to achieve better motivation and engagement from workers. 4. *Recap* (30 minutes): Role play, discussion, advice. 5. *Q&A* (30 minutes): The expert or a factory owner answered any questions. (See Appendix 6 for further details)

3.4.3. Three stages of data collection and analysis

The main study began with an initial stage, from January to May 2019, which involved working primarily with the diaries to develop an understanding of the daily lives of workers and to discover what contributed to – or detracted from – their well-being at work. 466 factory workers commented on their well-being in a daily digital diary. On average they left 2,000 messages per week, generating a unique dataset in the authentic voices of Chinese factory workers. This initial, pre-intervention stage data was used to establish baseline metrics for both the well-being of workers and the performance of each factory.

In the next stage, as described fully in Chapter 4, a model for well-being was developed, positing causal relationships between training, the well-being of workers and factory performance. From this model it was possible to design interventions that might improve the well-being of workers and to formulate some hypotheses. In May and June 2019, interventions were conducted in two of the four factories.

Data collection would continue to the end of the year. In the third, more analytical, stage, post-intervention data was compared with the pre-intervention, baseline data, to test the hypotheses. Pre- and post-intervention factory performance data were also compared.

Table 11: Data collected and used in the main study

Source	Type of data	Use in the study
Diaries	Voice messages left by workers daily, captured as text and translated	Evidence about what impacts the sentiment and well-being of workers Comparison of pre- and post-intervention sentiment and subject focus
Factory performance metrics	Data collected from factories monthly: • rework rate • product attrition rate • order delay rate • worker attrition rate	To understand the impacts of the interventions on factory performance

The largest dataset collected during this 12-month, main study comprised qualitative data in the form of workers' daily digital diaries. Workers across four factories had commented on their day, adding observations about high or low points, and 16,390 such messages had been captured as text.

The researcher involved an NGO in China and two volunteers to support the translation of the diaries into English. The volunteers were native Chinese-speakers who had conducted their degree courses as English language programmes. To avoid cultural variances and interpretations as much as was possible, the Brislin (1980) guidelines on re-translation were followed. The Chinese version of each diary was checked against the translated English version for accuracy. All the final translated versions were also audited to reconcile any discrepancies arising from the day-to-day language of each particular worker.

As in the pilot, many of the 2019 diary entries were excluded from the analysis. These included entries on subjects such as what the worker ate that day or whether or not it was raining. This left only 8.3% of entries for subject analysis. This data was again organised using a grounded approach and open, then axial, coding, with entries again coded for subject matter and grouped into concepts, themes and aggregate dimensions (Glaser and Strauss, 1967; Strauss and Corbin, 2008; Gioia *et al*., 2013). A qualitative approach was adopted for the diary analysis as it was felt that this would allow for the content, which was important to answering the research questions, to be better understood. Workers were sharing their experiences, insights and emotions daily, a dimension which quantitative analysis would have lost along with their authentic voices.

Due to the scale of the main study, technology was used to automate the assignment of sentiment to each diary entry. Since no relevant supplementary datasets had been located for subject categorisation, subject was assigned manually, as during the pilot. The method was to

daily review each entry against a list of keywords assigned to each category. If an entry was ambiguous or featured multiple keywords a judgement was made on its main subject matter by the researcher. This diary review and assignment was conducted daily due to data volume and the potential ambiguity contributed by multiple languages.

However, for sentiment scoring, some relevant publicly-available datasets were located and these were added. The pilot diary entries, which had been hand-assigned sentiments, provided a useful baseline, and were combined with the *Primary Emotions of Statements* dataset which comprises 2524 sentences manually classified by emotion based on Plutchik's *Wheel of Emotions* (Plutchik, 1980; Williams, 2015). The original 18 emotions were grouped by the researcher into four sentiments to match those in the pilot data, as shown in Table 12, below.

Table 12: Sentiments as translated from the Primary Emotions of Statements dataset

Emotions in Williams (2015)	Translated sentiment
Awe, joy, love, optimism, trust	4 (Happy)
Ambiguous, anticipation, neutral, surprise	3 (Neutral)
Disapproval, fear, remorse, submission	2 (A little down)
Aggression, anger, contempt, disgust, sadness	1 (Unhappy)

The same procedure was applied to the *Sentiment Analysis: Emotion in Text* dataset which contains 40,000 tweets manually classified into 13 emotions (Figure Eight, 2016). These groupings are shown in Table 13, below.

Table 13: Sentiments as translated from the Sentiment Analysis: Emotion in Text dataset

Categories in Figure Eight (2016)	Translated sentiment
Fun, happiness, love	4 (Happy)
Empty, enthusiasm, neutral, surprise, boredom, relief	3 (Neutral)
Worry	2 (A little down)
Anger, hate, sadness	1 (Unhappy)

A compiled sentiment dataset comprising these 43,899 sentences and the 1405 diary entries from the pilot was used to train two Naïve-Bayes classifiers.

Before building the sentiment classification model, the data was pre-processed, beginning with two steps designed to increase accuracy by reducing the number of features in a classifier. The first of these involved removing *stop words* from each entry; these are prepositions, pronouns, conjunctions, punctuation and other words common in all sentences and not useful for identifying sentiment. A complete list of stop words is included in the NLTK library in Python. Each word was compared to the NLTK list and matching words removed. A second pre-processing step involved *lemmatisation*, which reduces the number of

useful features in each classifier by replacing similar words of the same part of speech with a common equivalent term. For example, *loved* and *loving*, both verbs, are replaced with the verb *love*.

Once pre-processed, each dataset was split into training and test sets. The training set contained 80% of the dataset, chosen randomly, with the remaining 20% used as the test set. Each model was trained against the training set, then used to classify entries in the test set. The resulting sentiment for each diary entry was compared with its originally assigned sentiment. Accuracy, defined as a simple ratio of correctly assigned entries to total entries in the test set, was 80%.

A second dataset, monthly performance data on each factory, was provided voluntarily by managers who populated an Excel file supplied and returned by e-mail.

3.5. General considerations

3.5.1. The ethics of diary research

For any researcher to engage with human subjects through their personal diaries requires rigorous confidentiality both in data-management and in reporting. A data-management plan was created at the beginning of the field research and data about the worker was separated from their diary. Data that could identify individuals or factories has been withheld throughout this thesis.

All participants had been invited and given the option to refuse. Volunteers gave informed consent for the capture and analysis of their diaries. Face-to-face meetings were used to explain the research and to ensure they understood. Workers were informed that they could leave their study at any point, and many did so throughout.

The Chinese labour-rights NGO would consult throughout, maintaining contact with workers and available to support them if necessary. An ethical issue specific to diary research concerns whether or not to intervene if a diarist reveals that they are at risk or a potential danger to themselves or others. Factors in this context included the government monitoring of WeChat and previous suicides in other Chinese factories. Therefore, workers consented to the NGO confidentially reviewing their diaries to ensure their safety, and contacting them if necessary, without that information being disclosed to anyone else. The NGO's head office is not more that 2-4 hours away from any of the factories, meaning the NGO could provide immediate support in any emergency.

Each worker was given a number and an animal name so that they could chat in the social-media group without confidentiality concerns. Only the researcher has the list of their names and aliases. Diary data was captured, stored and catalogued with rigour and analysed regularly. Factory management was not included in the diary research or given access to this data.

3.5.2. The responses of workers to diary research

One unanticipated impact of the diary method was that many workers began to treat their diary as a relationship and appeared to benefit from knowing that someone would later listen to what they were saying about their experiences and feelings. Many workers shared that their diary had provided them with a valuable outlet and it had often felt helpful to have someone to talk to, even with no reply.

Workers had been allowed to keep their diaries at their convenience, meaning they could freely choose when and where to record a message so that they would not be observed. They sometimes made a recording directly after an incident in their factory, making it feel very current and full of emotions. More often, workers kept their diaries at the end of each day.

Workers kept richer and more detailed diaries as the weeks passed. A marked improvement over time was observed in the value of the entries collected. As their study progressed workers became more confident and shared more and more information, even during the short pilot study. The main study diaries were significantly more informative than the pilot diaries, and also progressively improved. While growing confidence in the whole diary process may have led many workers to relax during the longer timeframe, resulting in a higher proportion of entries discussing only day-to-day details that were not particularly useful as data, toward the mid-point of the main study, individual entries also became noticeably longer and more detailed. Some relevant entries near the end allowed the researcher to really understand the day-to-day of the factory and the emotional engagement of that particular worker with it. This is not a trend seen with most research data. As time passes in a field study, whether survey-based, observational, experimental or a clinical trial, participation rates more often tend to drop, with confidence in the findings following them (Arfken and Balon, 2011). The increasing engagement seen was distinctive to this method as used in Chinese factories.

It became apparent that it takes time to build trust with this research method. It is also possible that the practice of diary-keeping is uncommon in China, and that this was a factor. Workers appeared to need time but as each study progressed they became more comfortable with and enthusiastic about sharing their thoughts and experiences with the researcher.

3.5.3. Limitations of the method

Implementation had revealed some limitations of the selected method. Diary data is unlike that produced by surveys or interviews. While the government monitoring of WeChat might have inhibited the confidences of some participants, there was little evidence of this as an issue. On the contrary, workers made recordings every day, contributing thousands of data points across the two studies. Since they were free to discuss anything, much of this was not actually useful. Analysis was similar to *panning for gold*: a great deal of material comes into the pan but only a very few nuggets are valuable. When coding the data, very clear work-related issues did, however, appear.

A further limitation of the main study was that the participating factories did not have particularly well-established routines for collecting some of the performance data required. It would sometimes prove necessary to ask for this data repeatedly, making collection challenging.

Due to geographical distance and other practical constraints the researcher was not able to remain at any factory for an extended period. Therefore, another limitation was that although initiating each factory training intervention in person, the researcher was only able to oversee the first two days of the skills training for workers. The factories were required to maintain this intervention in the absence of the researcher.

Diary entries had been collected as voice messages recorded in working factories and required translation into English text. In the host factories, as is typical in Chinese factories, there were many migrant workers. Data was therefore contributed in various languages and dialects. For the main study, Python was used to automatically assign sentiments to diary entries. Despite significant advances in automatic sentiment analysis, there remain major challenges, particularly, as here, with multiple languages and thematic domains. Kincl and Novák (2019) have observed the performance of sentiment analysis models to usually range at around 70-80%. Most approaches to assigning sentiment in a real-world context are far less precise (Grimes, 2010; Kincl *et al*., 2019). Diarists may use irony or metaphors to express their feelings (Poria *et al*., 2016). Academics warn against chasing unrealistic levels of automated classification accuracy, observing that humans typically disagree with a machine assignment in about 20% of instances (Ogneva, 2010; Kincl *et al*., 2019).

Manual checks of sentiment assignment revealed several instances where the assignment was questionable. All sentiment assignments were therefore manually audited in Chinese as well as in English, revealing that somewhat ambiguous entries without strong language had tended

to be assigned a neutral sentiment. A great deal of manual work throughout was necessary to ensure workers' voices were represented accurately and because sentiment indicators would be critical to answering the research questions. While human assignments may be variable, automation had not, in this case, provided complete accuracy either.

Chapter 4. Findings

This chapter is structured in three parts. The first two detail findings from the 2017 pilot study and the initial stage of the 2019 main study respectively, outlining the concepts, themes and aggregate dimensions observed in the diaries and describing these to answer the first research question: *What are the factors that influence well-being for Chinese factory workers?* (Please note that the 2017 pilot was also discussed in a paper published by the researcher in 2020 [i.e. Bellingan *et al*., 2020]. There are therefore some similarities since they share an author and reference the same data.) The third part outlines a theoretical model for workers' well-being and some formulated hypotheses, then discusses the impacts of the interventions on the well-being of the workers as determined by comparing pre- and post-intervention diaries. It then considers pre- and post-intervention factory performance metrics to answer the second research question: *How does workers' well-being influence factory performance?* Figure 6, below, outlines this structure.

Figure 6: Findings structure
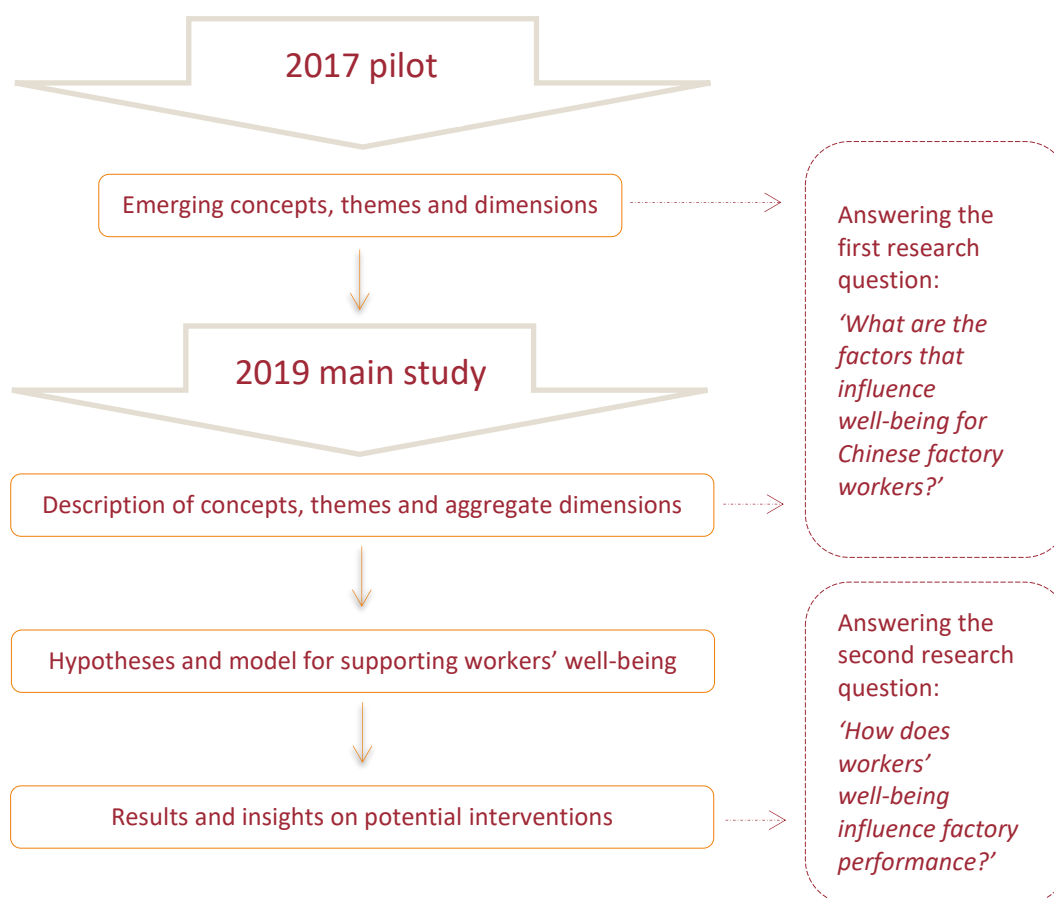
4.1. 2017 pilot findings

The pilot had tested the digital diary method while starting to address the first research question: *What are the factors that influence well-being for Chinese factory workers?* As described, workers at one factory had kept daily diaries over 100 days. Findings from that pilot would later be combined with findings from the pre-intervention stage of the main study to develop a theoretical model and design the interventions to be tested.

4.1.1. Data structure

While testing an innovative research method, the pilot had also begun to investigate factors influencing the well-being of the workers in a Chinese factory. The pilot diaries provided a broad picture of the factors involved, which included hedonic, eudaimonic and social well-being aspects of both life and work.

Many issues influencing the well-being of these workers were not directly related to their work. Social well-being concerns were seen in the most entries: community and family relationships and friendships are evidently important to these workers who chose to talk about them more than about their work. Factors seen to impact the well-being of a worker tended to be relational rather than about their physical state, and also included relationships inside their factory.

Most of the diary entries collected were about workers' lives outside their factories. The diaries provided a broad picture of the factors involved in their well-being, which included hedonic, eudaimonic and social aspects of both life and work.

Examples of general life or work subjects as mentioned in these diaries and the types of well-being they impact are shown in Table 14, below.

Table 14: Types of well-being described in the pilot study diaries

	Hedonic	Eudaimonic	Social
Life	Financial situation Health Food (local food and healthy food) Live in hometown Enjoy favourite things Holiday	Personal aspirations (pay off debts, buy house) Experiences − travel, food Learning − go back to school	Community in hometown Family relationships Romantic relationships Friendships
Work	Reworking constantly − tasks too complex, poor-quality raw materials (negative) Delays − machine breakdowns, slow colleagues, late raw materials (negative) Work environment − shouting, fighting / peaceful, harmonious Adequate rest / overwork	Work targets – achieved, supporting life goals / not met despite hard work Self-worth and development opportunities / no learning or promotion Short- and long-term aspirations	Relationships with colleagues Relationships with leaders Team spirit and camaraderie in factory (or lack of it)

Adapted from Bellingan et al. *2020.*

As might be expected, hedonic well-being issues were the most mentioned in respect of work. The online dictionary of the American Psychological Association (APA) (https://dictionary.apa.org/) defines *hedonic* well-being as that achieved when pleasure is obtained and pain avoided. This may arise in a factory from the individual's short-term positive evaluations of its standards versus their expectations. Defining well-being in hedonic terms is therefore less likely to facilitate long-term meaning or to support the sustainable achievement of workers' well-being (Steger *et al*., 2008; McMahan *et al*., 2010).

There were also frequent mentions of eudaimonic well-being issues such as personal aspirations and ambitions. As defined in the APA, *eudaimonic* well-being is achieved through self-actualisation and having a meaningful purpose. Work outcomes were seen to significantly impact what was important to these workers in life.

The full data structure developed to analyse that portion concerning the workplace is detailed in Figure 7, below.

Figure 7: The data structure developed from the pilot study

First-order concept	Second-order theme	Aggregate dimension
• Professional goals (e.g. set up business) • Personal goals (e.g. new experiences) • Family goals (e.g. reunite, or pay for family needs)	Goals beyond the factory	Social displacement and long- and short-term motivations
• Sadness due to separation from family • Isolation and loneliness	Struggles to adapt to living in factory	
• Not enough machines, machines breaking down • Not enough, late or defective raw materials • Colleagues cause delays in the process due to lack of training	Production delays	Hard work without meeting targets is demotivating
• Inadequate instructions to complete task • Inadequate time to practice task • Stress and pressure to work fast on complex tasks	Rework	
• Disrespectful manner e.g. scolding, yelling • Favouritism • Lack of opportunities to learn	Feeling devalued by supervisors / managers	Negative/ positive impacts on self-worth, camaraderie, sense of belonging
• Annoying behaviour (e.g. noise, gossip)	Feeling devalued by colleagues	
• Recognition by peers and managers • Learning / development opportunities • Diary study participation • Compensation paid on time	Workers feel appreciated	

A similar structure was offered in Bellingan et al., 2020.

The three emerging aggregate dimensions were: 1) a clear link between factory workers' short-term motivations and their long-term life goals; 2) the demotivating impact of factory operational problems and 3) the importance of relationships in a factory.

Table 15, below, shows diary entry counts for the concepts and themes comprising these dimensions.

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Table 15: Composition of aggregate dimensions in coded pilot data

First-order concept	Entry count	Second-order theme	Entry count	Aggregate dimension	Entry total
Professional goals (e.g. set up business)	3	Goals beyond the factory	8	Motivation for long- and short-term goals	81
Personal goals (e.g. new experiences)	4				
Family goals (e.g. pay for family needs)	1				
Sadness or guilt due to separation	18	Separation from family	73		
Isolation and loneliness	55				
Not enough machines, machines breaking down	13	Production delays	20	Hard work without meeting targets is demotivating	44
Not enough, late or defective raw materials	2				
Colleagues causing delays in the process	5				
Inadequate instructions to complete task	16	Rework	24		
Inadequate time to practice task, stress and pressure to work fast on a complex task	8				
Disrespectful supervision, e.g. scolding, yelling	20	Workers feel devalued by supervisors / managers	26	Impacts on self-worth, sense of belonging	166
Favouritism	4				
Lack of opportunities to learn	2				
Conflict with colleagues, annoying behaviour, arguments, bad language	12	Workers feel devalued by colleagues	12		
Earnings paid on time	16	Workers feel appreciated	128		
Learning / development opportunities	27				
Recognition by supervisors and peers, camaraderie	46				
Participation in diary research	39				

Impacts on workers in the three aggregate dimensions as mentioned in diaries will be discussed in more detail in the next section. Anonymous diary excerpts are used often to ensure the authentic voices of workers are heard.

4.1.2. Motivation for long- and short-term goals

4.1.2.1. Goals beyond the factory

A big emphasis was seen in the pilot diaries on eudaimonic well-being concerns, and in particular on the achievement of long-term life goals. Diary entries often featured comments about that worker's reason for working in a factory, which was almost always to achieve a better life for themselves or for family members. Such long-term goals shaped the way in which they regarded their everyday work.

A common aspiration was to start their own business. An example from a diary which linked this to the worker's short-term motivation is:

'I want to open a small restaurant selling Sichuan-style hot and sour noodles. I'm inspired to work hard by this goal'.

Life goals could include an individual's hopes to travel or study, but were more often linked to financial stability for the whole family. Many mentioned paying for a house:

'Recalling the goal I set for when I was 30 years old, I've just about achieved it. The next goal is to own my own house.'

Other goals mentioned included improving the prospects of the next generation by financing their education or a wedding.

4.1.2.2. Displacement and struggles to fit in to factory life

Many of the migrant workers expressed sadness in their diaries at their separation from family. Some manage to return home only once a year, for the Chinese New Year festival. Relationships with their family and hometown community were important to these workers whose social well-being was impacted by the long separation.

Separated from family, often including their own children, for up to a year at a time, some workers spoke about missing children they rarely see:

'Today is my son's birthday. I can't be with him as I'm working far from home. I don't even know whether he's happy or not. I'm alone here and I miss him a lot! I feel so sad'.

Some had failed to make friends in the factory, and appeared lonely without family support:

'I just finished a video call with my son. This was the most valuable time of my day. I was very happy when I could share everything with my family. Since I came here to work, I don't talk a lot with other people. We all know we came to the factory to make money, not to make friends.'

This was seen throughout the diaries to link back to eudaimonic concerns such as the achievement of long-term life goals, which often involved reuniting with family in more prosperous circumstances:

'When I was a child, my dream was to be a great person. Now that I have a family, my goal is to get some kind of professional skills, and then to start my own business. With a stable income and a healthy body, I can then stay with my children and parents, and live a simple, happy life.'

4.1.3. Hard work without meeting targets is demotivating

Factory workers are usually paid according to the number of tasks they perform during the day and rewarded for meeting goals set by management. If goals are not achieved they cannot expect their maximum remuneration.

4.1.3.1. Production delays

A variety of operational delays were reported in diaries. These included machines breaking down and mechanics failing to fix them, problematic raw materials, and failures earlier in the production line. All almost always led to some workers being left waiting around, unable to work toward their daily targets.

'Today I was not in a good mood, as my work didn't go well. The machine broke down again and it took the mechanic all morning to fix it. As a result, I didn't finish many goods this morning, which affected the team's overall performance.'

'The upstream process didn't get finished as two machines had broken down. As a result, I had no goods to work on, and wasted a lot of time waiting around. It's so annoying!'

4.1.3.2. Rework

Constant rework was another source of the frustration seen in the pilot diaries. Rework is not paid as workers are paid for each final, quality-approved product. Many workers mentioned being required to rework a whole day's production the following day or even that same evening:

'It's been really annoying today, nothing but rework!'

Often workers mentioned having been unable to execute their task due to a lack of training:

'Today was supposed to be a day off, but the elastic band I made yesterday will be shipped tomorrow, so I went in today to do rework. I was in a bad mood because it wasn't my fault. It was the first time I'd done them and the leader didn't tell me how to do it. I had to just do them by myself. After the quality problems came out, the leader came to see my work and said it was wrong.'

Workers also described pressure to produce goods fast to high quality standards leading to mistakes:

'Today, the bags made by our group are very unsatisfactory. There were many problems. This could be due to too many processes and such strict quality requirements. I hope tomorrow we can do it better and produce more without creating so much rework.'

When even working harder did not allow them to meet their productivity targets due to problems outside their control, workers became demotivated. Such issues also led to increased overtime, a phenomenon that has prompted media concern. Workers reported very long hours and working many days without a break:

'I've been working for six days straight, including overtime at night. I'm exhausted.'

Overwork is a clear obstacle to a person's physical, hedonic well-being.

4.1.4. The impact of working relationships

4.1.4.1. Friction with supervisors and colleagues

While diaries displayed social well-being arising from good working relationships, many also mentioned unproductive supervision, and particularly being *scolded* (i.e. shouted at).

'The team leader's attitude is very bad, he's harsh and critical. I was not feeling well, and rather than all my hard work and overtime being appreciated, I got insulted!'.

Relationships clearly matter to workers' social well-being in this context, and such behaviour can be extremely detrimental.

An undercurrent of the social problems that often arise when people live and work together in close proximity also appeared in some pilot diaries in the form of complaints about workplace behaviour and noise.

'I was very angry today. Colleagues near me kept talking and talking, they were annoying! Can't they shut up for a moment while I'm working? They even called me a "bitch", it's totally unacceptable!'

4.1.4.2. Feeling appreciated

Workers described in their diaries some positive social aspects of factory life like feeling appreciated by colleagues or selected for training. These positive relational aspects supported both their motivation and their social well-being.

Several types of short-term well-being appeared in these diaries, including the hedonic well-being associated with fair remuneration. The factory hosting this pilot pays its workers

promptly, and they appeared to feel appreciated when paid fairly and on time. One worker described feeling valued by the factory's management:

'Today I took a day off. I'd planned to take my kid out to play but unfortunately I caught a cold. I should have missed my attendance bonus this month as a result, but I was allowed to keep it. If you ask me how I feel about [factory name], I think it's a second home to me. I've worked here for many years and today I finally understood how important this factory is to me.'

Workers also described being motivated by direct recognition from supervisors:

'Praised by the boss! I now wish to do even better, and will strive to rise to the position of director'.

Some mentioned the recognition of being selected for learning or development opportunities:

'The company wants to train some workers with a view to promotion to team leader in the future. The director picked me as one of them. I'm so happy!'

Working successfully together with colleagues or receiving thanks from peers could have a similar effect:

'A colleague is leaving soon. She said she wanted to thank me before she left. I was the first person she met in the factory and I taught her how to make a bag. I was so surprised and excited; I am happy to do the same for any new colleague!'

The diaries indicated that most workers saw training as an opportunity to be better at their work, and welcomed opportunities to improve their knowledge and skills, not only in hopes of changing or developing their role, but also with the aim of performing better day to day.

'Today I've come into a new field and been asked to learn some new things. So I'm a little nervous, afraid of making mistakes, but the prospect of learning new things also gives me energy'.

Positive relational aspects of factory life, like productive teamwork or a colleague or manager showing appreciation, were seen to contribute to a worker's social well-being while also allowing them to feel hope with regard to their long-term goals.

4.1.5. Summary of pilot findings

Analysis of the diary entries collected during the pilot study suggested a complex web of factors influencing the well-being – hedonic, eudaimonic and social – of the migrant workers in this Chinese factory. These factors were interdependent: operational issues, while immediately impacting their hedonic well-being, also negatively influenced their productivity, preventing them from achieving their targets. This not only led to lost remuneration, impacting workers' eudaimonic well-being through their life goals, but also undermined

relationships in the factory, damaging workers' social well-being and leading to reduced self-worth. The inability to influence these aspects of their environment or to address issues led workers to lose any hope of achieving their longer-term life goals, reducing their eudaimonic well-being.

Figure 8: Interplay of the well-being types and issues described in the pilot diaries

Teamwork, training vs
friction, scolding, conflict

Social

Relationships with colleagues

Quality of supervision

Hedonic

Practical factors, efficiency (errors, delays, stress vs work going smoothly)

Camaraderie, feeling appreciated vs relationship strain

Eudaimonic

Life objectives

Hopes for promotion

Sense of achievement

Motivation, purpose, vs despair, frustration

This very early data suggested that workers' concerns, both personal and professional, extend beyond what is currently measured by factory audits. Those seen tended to be more relational and less about their physical state. It became apparent that the matters important to workers – the potential to advance toward a long-term vision of their future through compensation and learning, and good relationships with colleagues and managers – are not those made visible to buyers through factory audits. The emerging picture was more complex than that suggested by the concerned Western narrative.

Even in a short time the workers' diaries had started to come to life, producing fascinating insights and information. The research had begun to show the potential of asking workers themselves what impacts their well-being. The method was therefore next used as part of a full-scale study.

4.2. Main study findings

4.2.1. A longitudinal study of well-being and its improvement

The pilot had shown that diary research could work in this environment and that data could be collected from workers to address the first research question. A much longer main study, including four factories and significantly more workers' diaries, then addressed both research questions. After an initial five months of collecting and analysing diary entries it tested interventions comprising separate trainings for workers and their line leaders. Factory-level performance data was gathered monthly throughout to help to answer the second research question: *How does workers' well-being influence factory performance?* This main study produced three distinct sets of findings, which are addressed below.

4.2.2. Insights from the pre-intervention main-study diaries

Considering the first research question – *What are the factors that influence well-being for Chinese factory workers?* – the main study diaries collected before the interventions confirmed the three aggregate dimensions of impacts on the well-being of workers as:

- Linked motivations for short- and long-term goals
- The demotivating effect of working hard without meeting targets
- Self-worth impacted by relationships at work.

Although these dimensions were unchanged from the pilot, the consolidated data from a significant number of workers at four factories, again analysed within a three-level structure, generated a deeper and broader understanding of the issues (Corley and Gioia, 2004).

Analysis again showed a complex web of linked factors influencing workers' hedonic, eudaimonic and social well-being. Struggles with separation from family, the inability to meet factory targets due to operational issues and relationship strain leading to reduced self-worth were all mentioned in significant proportions. Operational issues negatively influencing their remuneration were again seen to damage a worker's eudaimonic well-being by impeding their ability to achieve their long-term goals and therefore to feel that their work had purpose. This main study data again indicated social aspects of factory life as important to workers. As operational problems caused production delays, relationships with both their colleagues and line leaders were strained, reducing social well-being.

Operational problems were discussed in the second largest proportion of these diary entries. Issues outside their control prevented workers from achieving their daily targets, not only negatively impacting their sense of environmental mastery and their long-term life goals but

also damaging working relationships as frustrations led to tension with both line leaders and colleagues. Table 16, below, shows a summary of all the main study's concepts, themes and aggregate dimensions, with diary counts from pre-intervention diaries.

Table 16: Composition of coded aggregate dimensions in pre-intervention main study diaries

First-order concept	Entry count	Second-order theme	Entry count	Aggregate dimension	Entry total
Family goals (e.g. reunite, or pay for family needs)	10	Goals beyond the factory	30	Motivation for long- and short-term goals	85
Professional goals (e.g. set up own business)	17				
Personal goals (e.g. new experiences)	3				
Sadness due to separation	19	Separation from family	55		
Isolation and loneliness	36				
Not enough machines, machines breaking down	32	Production delays	89	Hard work without meeting targets is frustrating and demotivating	146
Not enough, late or defective raw materials	25				
Colleagues causing delays in the process due to lack of training or poor raw materials	32				
Inadequate instructions to complete task	27	Rework	57		
Inadequate time to practice task	17				
Stress and pressure to work fast on complex task	13				
Disrespectful supervision (e.g. scolding, shouting)	13	Feeling devalued by supervisors / managers	27	Work relationships, self-worth, feeling part of something	277
Lack of opportunities to learn	1				
Favouritism	13				
Annoying colleague behaviour, work conflict	58	Feeling devalued by colleagues	63		
Resentment based on favouritism	5				
Learning / development opportunities	51	Feeling appreciated	187		
Compensation paid on time	35				
Participation in the diary research	34				
Recognition by peers or supervisors	67				

This analysis again indicated a complex web of well-being factors, as operational issues negatively impacted personal long-term goals, also undermining working relationships.

4.2.3. Motivations and social displacement issues

4.2.3.1. Goals beyond the factory

As in the pilot, a big emphasis was seen in the pre-intervention main study diaries on eudaimonic well-being concerns, long-term life goals and the worker's reason for working in a factory.

Again, many mentioned hoping to start a business, to travel or to acquire new skills. A significant proportion wanted a better life for their families and were motivated by long-term life goals such as supporting a good education for their children or building a home for the family. A common view was that while living and working in a factory they were investing the time spent away from home and family to finance improving life for the family at home. The ultimate goal was often to be able to support the family while living at home with them.

Workers sometimes took an instrumental view of their factory job in this context. For example:

'I had the medical examination today. I hope my body is in good shape, so I can renew my contract and work here for few more years. I need to work hard to earn more money. Once the mortgage is paid off, life will be easier and I can go back to my hometown to be with my kids.'

4.2.3.2. Social displacement, separation and isolation

Social displacement arising from migration was a more prominent theme in the main study versus the pilot. Introducing three more factories and many more workers had provided a much larger group of migrant workers who were very far from home.

The main study diaries, collected over 12 months, revealed a great deal more about the workers' families than those from 2017, with many more diary entries mentioning family. Separation from hometown community, family and friends appeared to impact these workers' social well-being. This again manifested as sadness at separation and struggles to fit in to factory life. Loneliness and isolation appeared in various diaries throughout. While this phenomenon had emerged in the pilot study, it became more prominent with the substantial increase in scope, and more complex insights were gleaned.

87% of main-study participants had travelled from remote provinces (i.e. more than five hours' drive away). The origins of participating workers, relative to the locations of their four factories, are shown on the map below.
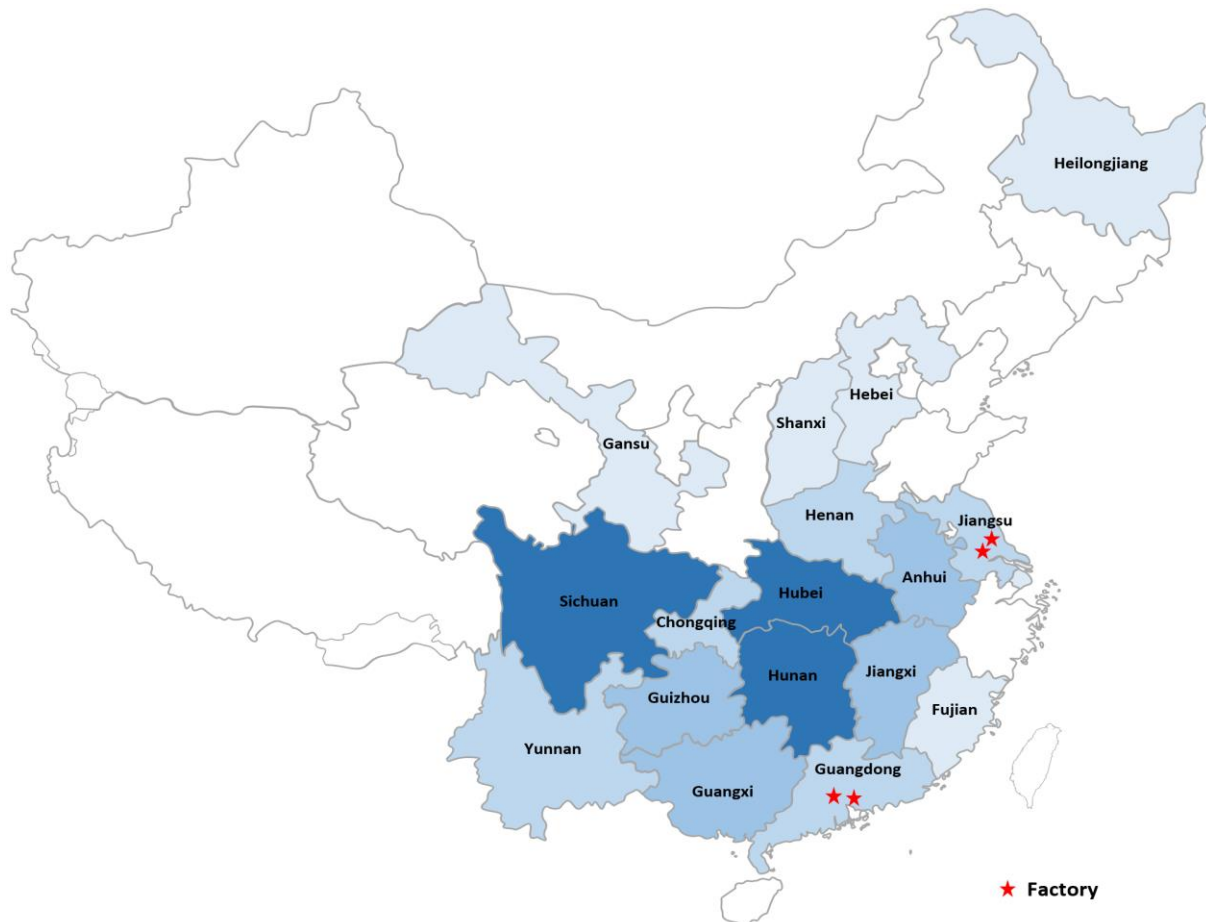
Blue indicates origins of participating workers. More workers come from darker blue areas.

Again, the Chinese New Year break was the only time many could confidently expect to be with their family. Some workers mentioned being afraid to ask for a leave long enough to allow them to go home, or managers refusing their requests:

'There was an earthquake near my hometown. I'm really worried about the safety of my family and friends. But I can't do anything for now, my supervisor won't approve my request for days off due to the heavy workload in peak season. I don't want to lose this job. I'm depressed!'

With extreme distances, the cost of travel is also often prohibitive. Visiting home only once a year means missing family on other national holidays:

'Tomorrow is mid-autumn festival! It's so sad that I can't celebrate with my parents and children in my hometown. I'll be here alone with a mooncake! As I miss another holiday with them, I realise my children are growing up fast. I will have a video call with them, though.'

Many of the participants in the main study were particularly young, and living alone in dormitories. With 43% aged under 30, many were not used to being away from home for long periods.

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Table 17: Ages of the workers participating in the main study

	Age					
	16 - 20	21 - 30	31 - 40	41 - 50	51 - 60	*No Answer*
Number of Workers	53	146	148	93	19	7
%	11.4%	31.3%	31.8%	20.0%	4.1%	1.5%

All demographic questions were voluntary and some workers did not supply this information.

Separated from family, sometimes for the first time, a number of these younger workers seemed extremely lost. For example:

'I don't have to work overtime this evening. I miss my parents. Thinking about them has made me cry … I'm missing them so much that I'd give all my salary to be with them … Working in the factory is hard. I'm alone all the time.'

Several entries mentioned the pain of separation combined with worry about the family's well-being. Many had to try to maintain family relationships via the internet or telephone:

'Almost a year's gone in what seems like the blink of an eye. I'm busy working just to make ends meet, while a lot of other things need my attention. My elderly parents in my hometown are worried about me. My brothers and sisters are all apart. I have no idea when the family will gather again, all we have is the telephone when we can.'

Many workers were specifically concerned for the well-being of their parents but felt unable to help. For example:

'Time flies. It's rained every day recently. I don't know if my parents are OK. Is it raining at home as well? I hope they're well. No matter what they do, I'm happy as long as my parents are healthy.'

Sadness often seemed compounded by guilt. One worker spoke about wanting to be closer to home in times of need:

'I missed my mother today. I called her and learned she'd fallen down the stairs. Fortunately, it's not very serious, but I feel guilty that I can't stay in my hometown to take care of her. If there was a job there that could provide the same salary as here, I would definitely go home! I feel so guilty that I'm not there for her. I hope she'll recover soon.'

Another migrant worker mentioned her father's deteriorating health and being unable to be with him:

'My father is ill, but I can't go to visit him because of work. I feel a little upset today. I have to wait until the right time to ask to go home.'

More than one worker mentioned the devastation of having lost a family member while away from home for work. For example:

'I just heard the sad news that my grandfather passed away suddenly yesterday. He'd raised me since birth, and I'm only here to earn the money to build him a decent house. If I'd known this farewell would come so soon, I would have stayed at home with him. So sad! God knows what I have missed!'

The main study diaries made it clear that many workers are concerned about their family's well-being and the impact on their families of their working so far away.

Many migrant workers' children were *left behind* with their grandparents. Workers are usually making a conscious sacrifice to meet their longer-term goals, but leaving children is nevertheless always painful:

'When I got in the car to go back to the factory, my baby was crying loudly. It's heartbreaking to have to leave him in my hometown, but I have no choice. I can't look after him at the factory.'

Workers mentioned concerns about the potential effects on the children of their absence and the burden placed on the grandparents. For example:

'I haven't been feeling well lately. Sometimes I suddenly realise my children are growing up day by day. My parents are getting older. I call them almost every day, but I still feel ashamed that I'm not at home to take care of them. I'm alone in this city. I feel lonely when I go to dinner, I really miss them!'

Even though working for the family and sending money home, workers shared regret at not being around in person for parents, siblings or children. One described the absence of parents in her youth and her current separation from them, her brother and her own children:

'When I was a child, because my parents were away working in a factory, I took responsibility for taking care of my younger brother. I sometimes had a bad attitude to him. I don't know if this is why we now have little contact. I really miss him! If I could go back in time, I'd definitely be a good sister. Now I feel a bad mother to my children and child to my parents and we're all apart, alone.'

Workers were seen to be compromising their relationships with families, which should be a source of social well-being, hoping to improve all their lives by achieving their longer-term goals. This is a difficult trade-off and the diaries indicated many workers torn between the financial rewards needed to support their longer-term aspirations and the sacrifices they were making. One worker described struggling to reconcile the wish to earn money to benefit the children with one child's need for a parent:

'I've been working hard to make more money so my children can go to school. I don't want them to do what we do now, they deserve a better life. However, life is not ideal. Today my mum called to tell me my son's had a fight with a classmate and the school may record him a demerit. I wish I was there

to speak up for him, but the school's far away and the flight's really expensive. I know money is important, but isn't family connection? What a dilemma!'

These diaries show separation from parents, and often from their own children, as a serious concern for many workers. They are not free to travel home often enough to support ailing parents or bring up the children. Those with both are conscious of the burden on their parents and of their children growing up without them. This appeared to make many very unhappy.

As in the pilot study, some migrant workers had apparently failed to make friends at their factory. Making friends can be difficult when working so many hours. Some also faced the particular challenges of belonging to what in China is called a *minority group*, i.e. a Chinese ethnic group other than Han Chinese. While Han make up more than 90% of the population of China, there are also 55 of these minority groups, many from regions known to be rural and undeveloped. Many of them speak local dialects and have unique customs, costumes and festivals. Several mentioned feeling left out or treated differently by the group:

'I feel so lonely in the factory. I can't make friends. I know the other workers don't like me because they think I'm from a poor province. Talking to them is very difficult … I'm so sad and lonely here.'

Workers mentioned in diaries having no one they felt they could talk to openly. For example:

'I want to share my feelings but I don't think my colleagues or room-mates are the right people to talk to. We're from different provinces and they don't really understand me. I hope to find some friends by playing online games on my mobile. It's sometimes easier to talk without worry when everyone's anonymous online.'

Two of the four factories are in southern China where, in addition to the range of minority dialects, Cantonese is spoken, a language very different from the more common Mandarin. Language issues could make making friends with other workers even more challenging:

'I'm from a rural area. People in my village don't receive much education and I can barely speak Mandarin. Colleagues make fun of me and laugh at my accent. Most of the time I don't even know why they're laughing but I hate their jeering faces. If it wasn't for the high salary here, I'd go home!'

Those with a religious practice could face similar social barriers:

'I've never gone out to dinner with all the other guys but I wish they wouldn't keep excluding me. It's just because my religion doesn't allow me to eat meat! They say they don't believe me because I look kind of fat. Come on, guys, can't a vegetarian be a fat boy?'

This social isolation was an important part of the context in which some workers operated and had a profound influence on their well-being. After a long day's work including overtime,

facing operational and other challenges, they had no one to tell if they had been treated unfairly or experienced an upsetting incident, and lost not only self-esteem but also emotional resilience. Younger workers in particular appeared to struggle to stay positive in the face of such difficulties. Problems integrating were among several factors demotivating these workers and undermining their well-being. The eudaimonic well-being they gained from their dreams of a better life for themselves or their family could be overshadowed by the negative impacts of their immediate situation, preventing them from realising their true potential.

While measures to mitigate social displacement issues were beyond the practical scope of this study, some other concepts indicated by the pilot and pre-intervention diaries would be addressed by interventions. For this reason, pre- and post-intervention diaries are referenced below.

4.2.4. Work frustration and demotivation due to inability to meet targets

Workers care about the work they do and their short-term goal to perform well in their factory is linked to the remuneration they need to finance their longer-term aspirations. That remuneration is linked to productivity targets and therefore an inability to meet those targets impacts their ability to achieve their life goals.

While work frustrations and their demotivating influence had already emerged as a clear well-being dimension, pre-intervention diaries from the main study confirmed that this was not particular to the timing or site of the pilot. The main study produced further indications that operational problems leading to workers feeling unable to meet their targets for reasons beyond their influence left them feeling frustrated by their lack of environmental mastery. Workers also shared more detailed insights as to causes (according to their own understanding).

Workers again reported production delays and rework, two themes already identifed. Each was described as preventing a worker from achieving their targets.

4.2.4.1. Production delays

Many workers aired the frustration of goals repeatedly missed due to the same operational problems occurring without their underlying causes apparently being addressed. Missed targets were seen to impact a worker's future aspirations, undermining their eudaimonic well-being as they lost hope, feeling their efforts at work to be fruitless:

'My dream is to be a taxi driver. I know some of my other colleagues also have this dream. I'm working to save for a car and a driving licence, so that I can move back home to be near my children

and parents and work as a taxi-driver. Work is frustrating, though – we keep missing our daily targets. Every day we're held up by other teams and I have no way to control this! I feel I'll never achieve my dream. I'm so unhappy.'

Operational issues also appeared to affect hedonic and social well-being as the work environment became more stressful, with colleagues sometimes shouting and fighting:

'We are working on CNY orders these days [i.e. in advance of the Chinese New Year break]. Every day there are arguments in the workshop. People keep quarrelling because the upstream team can't provide enough work for us downstream, so we waste a lot of time waiting. Why are they so slow, and shouldn't the management team do something?'

Raw materials arrived late to the production line or not enough were delivered. This then left workers standing idle and could lead to the entire team's daily targets being missed:

'Another day when no one in the team could meet their performance target. It seems there's a problem with the material for the back straps. We can't finish the products without the straps. So upsetting!'

Materials defects appeared to often cause process bottlenecks. Such problems typically arise from poor operational management. There seemed to be no processes in place at any of the factories to ensure the correct raw materials were delivered on time or crucial machines maintained regularly.

These diaries suggested that waiting for mechanics to come to fix broken machines was common. Also indicated by the pilot, this was mentioned in a large number of main study diaries. Machine breakdowns were indicated to cause frustration and missed targets:

'In the last hour of the evening shift, my machine broke down. An engineer came but couldn't fix it. Things were going so well until then! Now we won't meet today's targets. Work's piled up at my workstation and people were getting cross. I'm not sure it will be working tomorrow morning. If not, we'll all miss our targets again and everyone will be annoyed. It's so frustrating, but what can I do?'

'Today I was in a bad mood. The machine broke down at around 10 a.m. There were no mechanics in the factory and we couldn't find one elsewhere, so a mechanic didn't come until 3 p.m. During that time I got another machine to work on, but it wasn't the same as my machine. Because I wasn't used to it, I ended up failing in my task and got complaints from my downstream colleagues.'

As well as the frequent delays caused by breakdowns, workers sometimes mentioned not enough machines for all the workers who needed them.

Some workers also discussed colleagues causing them delays, either through mistakes or just being slow, a clear result of the lack of training also observed. Workers did not always know how to make the product and had often been allowed insufficient time to practice:

'Today I'm very depressed. One batch of products was finally finished and ready for pre-shipment inspection. The inspector quickly identified the use of the wrong outer box. The warehouse worker is new, and not familiar with the products. It could have been shipped early, but instead it got delayed for rework. I think the warehouse position really requires some training or experience.'

Both workers' skills training and line leaders' training on how to support workers and ensure they were able to perform their tasks seemed to be missing from the factories' processes. There appeared to be no on-the-job training if a worker was struggling or finding specific elements of their task difficult.

'After a day's rest I came back to work. This time I got a task which I find very difficult. A few days later, I'm still not able to finish it well and quickly. There's lots of rework and the people after me are kept waiting. I wish someone would give me some tips or show me how to do it better. I'm very stressed and tired.'

Poor planning of production-line timings can also create bottlenecks. A lack of planning by management seemed evident throughout the diaries. Workers questioned the rationale as they described being kept standing idle while simultaneously under pressure to produce more products faster:

'I'm really struggling to understand the current situation. On the one hand, they push us to work faster to catch up for shipment; on the other, we're kept idle, waiting for materials. We're either missing metal parts or labels. This is a big order but we keep having to stop working on it and switch to another style. It makes it almost impossible to achieve our performance targets.'

'I'd finished my assignment and asked my leader for my next task. He said there wasn't much work left. I had nothing to do but wait. Later he gave me a new task, but while waiting, I wondered why they can't plan their resources better. We're either too busy to even drink water or standing with nothing to do. I really don't like wasting my time like that. I need to work hard to feed my family.'

One team's work not co-ordinated well was reported to leave workers further down the production line idle:

'Every time the production line is assigned a new bag, a lot of the high-head sewing machine workers needed for the post-process will basically be idle for half a day, or only have a few things to do. Then the new fabric always arrives late or is cut wrong. It's so frustrating!'

As in the pilot, workers mentioned being frustrated by high levels of rework:

'We're making a leather handbag on my production line. Although it's a simple one and we've done it before, there's still lots of rework. So sad! The team leader emphasises the quality problems every morning, but there's no improvement.'

'We have an urgent order (for 2,000 units) which should have been dispatched today, but 1,000 need to be reworked, frustrating! The root cause is thread trimming. Loose threads are easily avoided if every workstation quality-checks the work of the people upstream. However, some tend to pass it on to another workstation and act like it's nothing to do with them. It's unnecessary and doesn't help.'

These workers are under pressure to produce large quantities of finished goods to high quality standards, often without sufficient training or support from managers. This results in rework and overtime as well as frustration and disappointment:

'This morning our target has increased to 600. The high output demand and strict quality requirements are hard to meet. Not everyone has the required skills. So we have to work overtime every day 'til late at night. We're all very tired!'

'Because of inadequate preparation at an early stage, there's a colour difference in the material. It's such a waste of time to have to rework it all.'

'The sales department changed the order spec but didn't notify us in time. As a result, we had to rework the whole order.'

The longer timeline of the main study allowed for insights into factory life during peak times when orders from big customers can be very large and with pressure to ship within shorter lead times. One worker's pre-intervention 2019 diary mentioned the factory having accepted an order, from a famous brand with strict quality requirements, for a million units to be produced in less than a month. The pressure to produce very fast to high quality standards was extreme and with no time to learn properly, rework was often required, leading to very long shifts and night work:

'Everyone was excited to start on the [brand name omitted] backpacks but it's been really hard. The order is so big. The fabric is hard to glue. We're all struggling and slowing down. I'm tired and the leaders keep shouting. I can't face another night reworking everything from the day. I want to cry. I bet I won't even get paid for the target production this month as it's all been such a mess.'

Workers are unhappy when they cannot do good work. They want to get tasks done but with many operational problems, no matter how hard they work they end up reworking and missing their targets. Some struggle to visualise ever achieving their long-term goals. However, workers did show some understanding of the systemic impacts of these problems and a willingness to help to address them:

'We need some checks before the first day of production starts. If these started a few days ahead of the main schedule, the post-process workers would always have enough work. This would increase our output. I want to share this, but no one wants to listen to us, the workers.'

Those doing the work are the most aware of the problems in their factories but are rarely consulted or even heard by management. Workers' feedback did not seem to be considered or incorporated into factory processes:

'Today I was informed by our QC team that all the sewing I did needs to be reworked, as the fabric looks crumpled. Later, they identified this as an issue with the quality of the fabric. I had reported this issue to my boss before, but he was too busy to think about quality, so it was missed. Now we're worried the order will be rejected by the client.'

This powerlessness to resolve the problems they perceived was seen to increase the frustration of many workers. With such problems often leading to rework and overtime, the resulting long hours and the strain of working into the night could be seen to impact both physical and psychological well-being.

4.2.5. Relationship strain leading to reduced self-worth

4.2.5.1. Feeling devalued by line leaders or managers

Some diary entries described upsetting events during the work day, and many workers mentioned unsatisfactory interactions with line leaders. For example:

'I asked my leader to check my work. He was busy and curtly said "Fine". In the past he's said "Okay" but my work then got rejected downstream. So, to avoid too much rework, I didn't work very fast. My colleague kept complaining, but, as expected, my work then got rejected. I had to rework all the bags I'd done. They took me all morning to unpick. I was so annoyed!'

Mistakes were compounded by other sources of stress on workers, such as time pressure:

'I'm very upset. I went to my leader for more materials and she asked me if I'd just finished the work she'd assigned me. I said yes and she responded: "Only just finished? You are so slow, even I could do

better than you!" I wanted to do more and am always trying my best. Can't my leader be more supportive instead of just being sarcastic?'

Most concerningly, many workers described managers shouting at them or their colleagues:

'How sick you are! We know you're the factory director, but you don't have the right to shout at us for no reason. Even if we have done something wrong, can't you talk to us in a nice way? Plus, the thing you were blaming us for is not a big deal. Is it that you're in such a bad mood, you want to make us all feel bad as well?'

Some also perceived favouritism on their production line:

'Today I was scolded by the line manager. He treats everyone on the line very differently. He's friendly and nice to the workers he knows and impatient with everyone else. It's unfair.'

Throughout the diaries workers mentioned struggling on a new task or being suddenly moved to an unfamiliar part of the production line. Some diaries mentioned inadequate training leading to scolding:

'The supervisor suddenly moved us to a different line, to stick pockets onto bags. I'd never been told how to do it and kept making mistakes. Because I kept asking the worker next to me I then got shouted at. What a horrible day!'

'Today, the material was stacked before the glue was dry. When the work flowed to my table, I noticed a lot of glue marks. I gave it back to my upstream colleague, but it was impossible to get off. Then the manager shouted at my colleague! Shouting wasn't helping. The manager hadn't taught her well, and should have noticed it when my colleague was stacking the material.'

Sometimes the problem was confusing or contradictory instructions from superiors:

'I'm not in a good mood today. It wasn't my fault but I got scolded by the manager! The supervisor said I could start sewing the goods, so I did. Who knew that later the manager would say I shouldn't have? I feel like giving up and quitting!'

The worker was often very unhappy and demotivated after such an event.

Workers seeing colleagues shouted at by line leaders also appeared to suffer impacts on their own social well-being, while the fear of being scolded could prevent them from asking for help, generating a cycle of further mistakes, more rework, and tiredness due to overtime:

'Today there was a lot of shouting in the factory. We're doing a new part of a bag and everyone is unsure about how to do it. The managers kept shouting. I was too scared to talk or ask for help. Tonight we will rework it and there will be more shouting.'

Reports of this type of treatment were frequent in the diaries, and workers appeared to feel disrespected or shamed, so that they lost status in the eyes of their colleagues, resulting in a loss of self-esteem. Relationships are important to these workers and unsatisfactory exchanges can impact their well-being. Workers also mentioned having to continue to work untrained, with no hope of achieving their targets as the cycle of mistakes and scolding continued.

Deteriorating well-being can lead to worker attrition. Throughout these diaries, workers mentioned colleagues leaving the factory. This impacts the workloads of those who remain and can be extremely demotivating:

'The manager of the handbag department is so bossy, he likes to shout at people all the time. They finally hired a few new people and they all left because of his shouting and swearing. So the old workers have to work through lunch every day. Fortunately I'm not in that department, otherwise I would have left long ago.'

Literature has shown that worker attrition increases a factory's costs. Constant recruitment involves executive time and work and often agency costs. New workers are known to impede productivity. They require basic training and usually take time to become efficient. Worker retention is therefore key to the competitiveness of factories.

4.2.5.2. Strained relationships with colleagues

Poor relationships with colleagues were also seen to undermine workers' well-being. These relationships could deteriorate due to conflict caused by operational issues, pressure to work fast and other aspects of the work environment. It became apparent that workers may start to blame each other for delays which lead to them failing to complete their allocated work for the day. Workers are motivated by camaraderie and teamwork and this blame damages both. In some diary entries workers were seen to blame colleagues for rework:

'Today the product had the wrong direction labels. It wasn't spotted by the QC lady, even though she checked them twice, unbelievable! If she'd found the issue earlier I wouldn't have produced so many defective products.'

'A colleague blamed me for his own mistake! How can he be so brazen? He even took the credits! Completely unreasonable!'

Poor relationships with machine mechanics were also in evidence. Workers mentioned them being unfriendly and unhelpful and several diaries described conflicts:

'Today I was upset by the repair technician. He couldn't find the problem, so he said I'd misused my machine! Then he tried to show me how to sew, but I couldn't just change my technique without my line leader's approval. He got angry. I didn't want to waste energy arguing; I burst into tears and went to the rest room. Everyone complains about him. His skills are weak and his temper very short.'

As in the pilot there was also evidence of workers being annoyed by colleague behaviour such as noisy banter and gossip.

'The noise of the sewing machine was already giving me a headache. Now an older lady with a very loud voice is sitting next to me. It makes my head spin so much it could explode. I can't concentrate on my work! I wish someone would switch seats with me.'

Workers can become irritable with each other as they work in close proximity daily, under pressure and on complex tasks which were often assigned without adequate training. This was seen to be exacerbated by long hours and frustrations caused by operational problems.

4.2.5.3. Feeling involved and appreciated at work

Because most workers both live and work at their factory, the quality of their at-work relationships is an important factor in their well-being. Good colleague relationships were indicated in many of the diaries to make workers happy and to motivate them.

'I need to pay for my kids' tuition fees, so I left home to work in this factory. I love this job, it's well paid and I've made new friends. Even if I have to work overtime every day, I don't mind as my colleagues are so nice. We chit-chat while working and eat together; it makes time fly and stops life becoming boring. I'm tired sometimes, but with a big family counting on me I need to stay strong!'

There were many examples of workers enjoying the chance to simply work happily together:

'Tonight all the people from the sewing workshop went to work somewhere else. We don't usually have much time to chat at work. Tonight we were all sat around a big table together, packing. We were laughing and talking all the time and soon it was 10 o'clock and we'd done lots of work! It was really good to see everyone tired but happy.'

Some workers mentioned feeling energetic and cheerful after a day of positive collaboration, which was seen to give them a sense of belonging.

Workers described feeling appreciated by management when they received training and especially when selected for development:

'Today we learnt a new stitching technique. I'm so happy I was chosen. I want to learn new things. I want to be able to one day work in my hometown near to my family. Learning new skills will help me to do that and training will help with my personal development. I'm so happy today!'

Many also suggested participating in the diary research was making them feel both appreciated and part of a group. They perceived that the objective was to improve things for them and their colleagues, suggesting they and their work were valued. This enhanced their well-being and motivated them in their day-to-day work.

The pre-intervention data showed operational problems in the factories negatively impacting workers' eudaimonic well-being. Demotivated workers, unable to meet their targets despite their best efforts, felt powerless to progress toward their goals outside the factory. This frustration impacted working relationships, important to workers' social well-being.

These pre-intervention findings had built on those from the pilot to address the first research question: *What are the factors that influence well-being for Chinese factory workers?*

4.3. A model for well-being and performance

An understanding of the early diaries and their identified themes was used as the basis of a model for well-being and performance. This informed the generation of hypotheses to be tested by comparing both the factories' performance metrics and the sentiments assigned to diary entries, pre- and post-interventions. The hope was to answer the second research question: *How does workers' well-being influence factory performance?*

Workers feeling unhappy in a factory are likely to leave that factory for another or to return home. Worker attrition increases a factory's costs while retention provides opportunities to develop experienced, well-trained workers. The model created proposed to improve the well-being of workers through training to address the operational and interpersonal problems in their factories, in the hope that with the resulting improved outlook and enhanced well-being, worker retention would also improve. This model is shown in Figure 10, below.

Figure 10: A model for improving the well-being of workers in factories
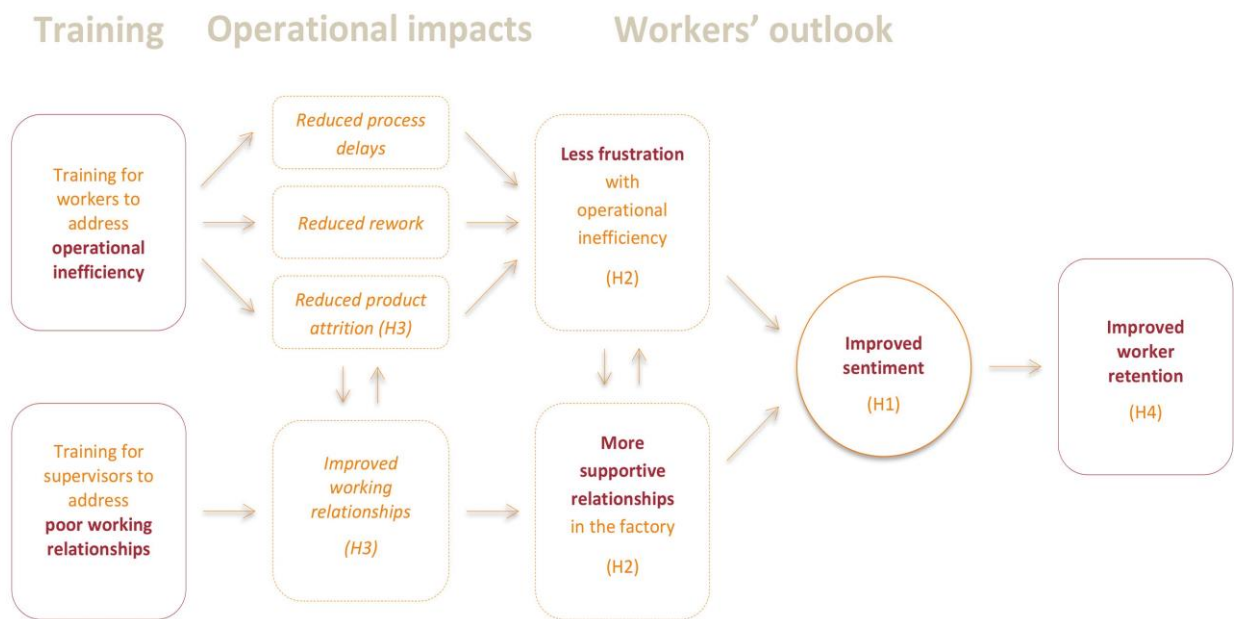
From this model and based on the early diary data the following hypotheses were finalised:

H1: *Sentiment in the factory can be improved by providing training for workers and line leaders.*

H2: *Training for workers and line leaders changes the focus of the workers' attention, generating more positive feelings.*

H3: *Training for workers leads to improvements to a) rework rates, b) product attrition and c) order delays.*

H4: *Improvements in sentiment lead to improved worker retention.*

The assumption is that both types of training should improve performance (H3). Because their frustration is linked to low performance scores, if a worker's performance improves, so should their well-being (H1 and H2). Happier workers are likely to build more supportive relationships with their colleagues and line leaders, further improving the general sentiment. This improves worker retention (H4) by removing some motivations for leaving the factory.

Training should not only improve workers' short-term performance but should also support their personal growth by allowing them to feel more autonomous and in control of their immediate environment. The supervision training was intended to contribute to more positive relationships in the factory, helping to improve both communication and workers' well-being.

4.3.1. Testing the hypotheses

Two interventions had been implemented to test these hypotheses and address the second research question. These had comprised two complementary work-related trainings, implemented in two of the factories and addressing some identified aspects of the work environment where intervention might mitigate the evident frustration of workers.

One of these interventions had aimed to reduce rework, reducing both worker frustration and order delays, and the other to improve supervision communication, improving workplace relationships and well-being and reducing worker attrition. Table 18 below shows the themes from the diaries and the interventions aiming to address them.

Table 18: Interventions addressing some of the identified work-related issues

Intervention	Worker skills training	Line leader training	Out of scope
Issues seen in the pilot and pre-intervention main study diaries	Rework caused by task complexity and insufficient training	Rework due to workers' poor self-worth and fear of asking for help	Rework due to poor-quality raw materials or overworked workers
	Demotivation due to poor self-worth and lack of learning opportunities	Lack of hope or a sense of the broader purpose of individual tasks	Machine breakdowns, late raw materials
	Frustration at targets not met	Inadequate training, not demonstrating or clarifying workers' daily tasks	Workers' long-term aspirations not achieved
	Colleagues too slow as they are unsure how to perform their tasks, leading to blame	Poor supervision relationships, including shouting and scolding	Personal relationships
	Deteriorating colleague relationships, stressful work environment	Lack of team spirit or camaraderie in factory	Social displacement, loneliness, missing family

Intervention impacts were measured by comparing diary sentiment from before and after implementation. Results were then considered in the context of factory-level performance metrics, to identify any influence on factory performance or worker retention.

Hypothesis 1 was that the interventions would improve the sentiment of workers in the factory. Sentiments attached to diary entries (i.e. happy, neutral, a little down or unhappy) were reviewed to see whether these had trended up or down following an intervention, and whether the change was significant. Table 19, below, shows sentiment scores for the full year across all diaries.

Table 19: Sentiment summary for the whole year (2019, main study)

Sentiment	Frequency (n=16390)	Percentage
Happy	5534	34%
Neutral	6288	38%
A little down	2484	15%
Unhappy	2077	13%

Table 20 shows sentiment before and after the training.

Table 20: Impact of training on sentiment (% of total sentiment scores)

Distribution by sentiment	Factories with interventions		Factories without interventions (Control)	
	Before (Mar-May) n=3202	After (Jun-Dec) n=5993	Before (Mar-May) n=221	After (Jun-Dec) n=272
Happy (%)	36.9	38.4*	29.8	29.9
Neutral (%)	29.7	38.8**	40	43
A little down (%)	19.9	12**	10	11.4
Unhappy (%)	13.4	10.7**	17.2	20

*Difference is significant at p<0.10. **Difference is significant at p<0.05.*

Although this shows a modest increase in the numbers of entries coded as happy, the most significant effect of the interventions was in reducing negative sentiment. Meanwhile, no significant changes were found in the control group. This suggests that the hypothesis that the training would improve sentiment in the factories where it was run can be accepted. Some examples from post-intervention diaries are:

'Today I learnt something new. Thank you for your teaching and support. Another happy day.'

'Today was another beautiful, busy day. Everyone was happy and working hard to get the goods made. I was very happy!'

Hypothesis 2 suggested an underlying mechanism for this change, which was seen in an alteration to the thematic content of the diary entries, not simply their assigned sentiment. Findings are shown in Table 21, below.

Table 21: Impact of training on relevant second-order well-being themes

Distribution by second-order well-being theme	Factories with interventions		Factories without interventions (Control)	
	Before (Mar-May) n=534	After (Jun-Dec) n=928	Before (Mar-May) n=36	After (Jun-Dec) n=64
Production delays (%)	15.7	9.2**	13.8	25.0
Rework (%)	10.3	5.7**	0.0	0.0
Workers feel appreciated (%)	32.8	50.4**	38.9	20.3**
Workers feel devalued by line leaders or managers (%)	4.7	4.1	5.5	6.2
Workers feel devalued by colleagues (%)	11.8	6.3**	10.8	9.4
Goals beyond the factory (%)	5.8	2.4**	1.5	1.0
Separation from family (%)	10.1	6.7**	3.0	4.1

**Difference between before and after is significant at p<0.05.

The analysis of the extent to which the different qualitative second-order themes were mentioned in a diary indicated some significant changes after the training. Specifically, there were fewer references to operational problems like production delays and rework, and data indicated significant improvements to relations in the factory, with workers more often reporting feeling appreciated, and less often feeling devalued, particularly by colleagues. No similar, significant changes were found in the control group (see Table 21, above). Thus, Hypothesis 2 was accepted. Examples from the post-intervention diaries include:

'This morning, because our director knows that everyone has been working really hard, he wanted us to take it easier, so he said tonight's target was 400 bags, and we'd only need to work overtime for three hours, so we'd get off work at 9:15 p.m. Today the weather is cooler, and we all wanted to get off early. Working hard as a team, we made 420 bags! We're all very happy.'

'Today we're working on a new style and we've encountered many difficulties. But after co-operating and all working hard together, we made 100 bags in an evening. This was the first day and it's normal for everyone to be slow, so it feels great to have finished so many products. I'm very happy.'

'Due to the tight delivery time on this batch of goods, we had to work an extra hour of overtime. However, everyone understood that this was what the customer needed, so there were no complaints. I like the way my team can work together to deliver the products to the customer on time while meeting the quality requirements.'

'I'm extremely busy. We're working overtime almost every day on a massive rush order. To save the time going to the rest room, I haven't been drinking much water. I can only make around 900 bags a day without sacrificing quality. If I was the customer, I'd also want to buy a good quality product, so I

would rather work overtime to ensure good quality. The upside is, we'll all get high performance scores and make more money. I'm tired, but happy!'

Hypothesis 3 was that these improvements would also boost three key operational indicators: rework, product attrition and order fulfilment rates. This was first tested by checking if factory performance had changed following the interventions. Findings are shown in Table 22, below.

Table 22: Impact of work-skills and supervision training on factory performance

	Factories with interventions		Factories without interventions (Control)	
	Before (Jan-May)	After (Jun-Dec)	Before (Jan-May)	After (Jun-Dec)
Performance (mean)	n=5	n=7	n=5	n=7
Rework rate (%)	0.721	0.610**	0.421	0.308
Product attrition rate (%)	0.091	0.082	1.237	1.136
Order delay rate (%)	1.379	1.173	0.866	0.728

**Difference between before and after is significant at p<0.05.

This shows that reported rework rates had improved significantly after the interventions. One post-intervention diary entry described this impact:

'We've just started working on a backpack. On previous orders, there were always a lot of problems. This time, several managers came to the production line to teach us how to make the bag well. Today, the team resolved all the issues together and all the backpacks we produced are perfect! It was everyone's concerted efforts that led to today's good results. It was worth it!'

Similar changes were not seen in the product-attrition rates, and order-delay rates in particular were not improved. The training interventions did not address all a factory's observed operational problems; they could not, for example, influence machine breakdowns or raw materials issues. During factory visits the researcher observed a substantial backlog at both intervention factories. Many factors might account for this, such as very large, last-minute customer orders or raw-materials shortages or delays. Workers were also observed to work a little more slowly in the heat of summer.

Hypothesis 4 was that these improvements would also reduce worker attrition in the factories. As shown in Table 23, below, the data collected indicates that this was significantly lower in the intervention factories after training, suggesting Hypothesis 4 should be accepted.

Table 23: Impact of work-skills and supervision training on worker retention

	Factories with interventions	
	Before	After
Worker attrition rates (%)	3.870	1.364**

**Difference between before and after is significant at p<0.05.

The basic objective of the first intervention had been to enable workers to better perform their daily tasks. Post-intervention diaries in the intervention factories showed signs of gratitude from workers, indicating that they value training and being able to perform their tasks well:

'In today's morning training meeting, the team leader taught us how to sew several materials together in one shot. Previously I'd had to stop a few times to adjust the threads, but with this new skill I can combine a few processes. I am so excited because now I can make more bags and earn more money! I really appreciate this training, thank you team leader!'

Enthusiasm was seen in workers' diaries for learning and gaining the understanding to become better at their jobs:

'Today our company gave us a lecture, which gave us a lot of information. I've learned some excellent skills to speed up my work. It was so useful and we all enjoyed it. I hope we can get more training like this in the future.'

Workers seemed eager to learn and excited to be able to perform their tasks better:

'Today the production line manager arranged a visit to another workshop and showed us the similar products they were making. With his illustration, I saw that there are some differences between our finished ones and theirs, and many things we could be doing better. I will pay more attention to the details and study hard from now on.'

The second training intervention had aimed to improve line leaders' training of, and communication with, workers. There were soon indications in the relevant post-intervention diaries of leaders utilising their new skills.

'The team leader has been on leave for two days for training. Now she's back, something looks different. She usually seems very mean. But today she was nice, with a smile, and gave us some useful instructions on sewing. Well, maybe she did learn something from the training!'

The workers' diaries showed that they are motivated by praise and happy when they feel they are doing good work:

'Today I was amazed when my supervisor praised me for being faster and more flexible at work. I've been in a great mood all day. He's never commended anyone in the team before! I hear the team leaders received some training lately, does this have something to do with his attitude change? Anyway, I will continue to work toward a small new goal every day, and keep doing better.'

While the training for line leaders had consisted of only one day, the diary entries seen afterwards indicated that it had had a positive influence on workers.

4.4. Field research summary

The first research question had set out to learn: *What are the factors that influence well-being for Chinese factory workers?* The second aimed to understand*: How does workers' well-being influence factory performance*? A digital diary pilot uncovered some early findings, showing that the method could provide new insights about workers and their well-being. It also suggested that daily operational issues were hindering workers' productivity, preventing them from achieving their targets, impacting their long-term goals for themselves or their families.

The three aggregate dimensions identified were: 1) social displacement, struggles with factory life and the trade-offs with long-term life goals; 2) frustration and demotivation due to operational problems impacting remuneration; and 3) relationships impacting self-worth. These were not independent: operational problems were understood to cause loss of remuneration impacting workers' life goals, which in turn undermined work relationships. Workers' inability to influence operational issues led them to lose all hope of achieving their longer-term goals, damaging their eudaimonic well-being. Relationships strained by these operational problems then negatively impacted the self-worth and therefore social well-being of multiple workers. Based on the success of the pilot a longer study including interventions and additional data was conducted. The initial five months of this 12-month study confirmed these aggregate dimensions. This resolved the first research question.

The second research question, which concerned impacts on factory performance, was then addressed. Analysis of the combined early diary data suggested two training interventions to address operational and interpersonal problems in the workplace. Pre- and post-intervention data showed that this training had influenced both well-being and performance. Most significantly, post-intervention diaries from the intervention factories indicated a reduction in negative sentiment. Analysis of the extent to which the different qualitative second-order themes were mentioned in workers' diaries suggested some significant changes in outlook after the interventions. Specifically, there were fewer references to operational problems and workers more often reported feeling appreciated, and less often reported feeling devalued by

colleagues. This action research had indicated that training had not only improved workers' sentiment but also changed their outlook.

Factory-level metrics indicated that the training had improved factory performance. In particular, the rework rate was improved significantly, from 0.72% to 0.61%. The product attrition rate was a little improved, from 0.09% to 0.08%, and the order delay rate was improved from 1.38% to 1.17%. The second research question was answered: there were indications that interventions had positively impacted both workers' sentiment and some aspects of factory performance. Reported worker attrition rates had also improved significantly after training, from 3.87% to 1.36%.

Chapter 5. Discussion

5.1. A gap in the literature

The main aim of this research was to discover the factors impacting the well-being of Chinese factory workers. A secondary aim was to establish a link between their well-being and factory performance. The literature review described in Chapter 2 showed workers in Chinese factories left out of the social sustainability debate, while audit-based regimes were seen to be both flawed and too limited in scope. Workplace well-being studies appeared to have largely overlooked Chinese factory workers. Field research would be used to address this gap. The following chapter will discuss the significance of its findings in the light of what had been discovered from the literature, explaining the new understandings and insights that emerged.

The literature discussing attempts by businesses to improve transparency in their global supply chains revealed the failure of current attempts to self-monitor using factory audits to provide the degree of transparency required. It became apparent to the researcher that more accuracy and reliability than that being provided by current audit regimes would be needed to support effective social risk management.

Close consideration of the stakeholder and legitimacy theories also revealed what the researcher considers a significant gap in SSCM literature around the factory workers and their well-being. Conflicting narratives about these workers' lives were also seen, both in literature and the media. No agreed standard was found in the literature against which the well-being of factory workers might be measured, and there was little agreement on how that could effectively be done. The researcher perceived an urgent need to move the workers more firmly to the heart of the social sustainability debate. This led the review to specifically seek insights into the well-being of workers, particularly in factories, and particularly in China, but also more theoretically.

The literature review as a whole informed the development of two research questions: *What are the factors that influence well-being for Chinese factory workers?* and *How does workers' well-being influence factory performance?* To properly address these questions it became clear to the researcher that fieldwork would be required into the dynamics of daily factory life and its impacts on the well-being of workers.

5.2. *How* social sustainability might be measured in factories

As discussed in Chapter 2, SCM literature showed businesses, under increasing pressure to compete for customers, often passing that pressure on to their suppliers. This could generate unsustainable business practices in factories, creating social risk for which the buying business was potentially liable (Johansen and Nielsen, 2011; Canzaniello *et al*., 2017). It is the researcher's view that while factory tragedies discussed in the media highlight the fact that audits are not providing sufficient transparency, much of this literature is more concerned with limiting damage to the buyer's reputation. Factory workers, who might reasonably be argued to be most affected by social conditions, were largely left out of the SSCM debate. In terms of legitimacy theory, their concerns were seen only to accrue merit when influencing other stakeholders in the buying business (Egels-Zandén, 2014). The researcher perceived a clear theoretical gap around their well-being.

Social audits may tend to focus on easily-observed physical working conditions (see Appendix 2 for examples). Despite the worker suicides at the Apple-audited Foxconn factory, no current regime was identified as assessing psychological well-being. Literature did not appear to consider whether successfully monitoring the well-being of similar workers might prevent similar tragedies. It is the view of the researcher that to achieve a socially sustainable supply chain, the workers should be both considered and consulted.

The literature did show current audit-based monitoring regimes failing to protect even physical well-being in some Chinese factories. Although mentioning a need for social monitoring, much SSCM literature discussed inconsistency across audit regimes, implementation challenges or auditor bias. Since audits are shown to be unreliable, the question of *how* to measure the well-being of these workers also remained. Technical articles found were concerned with improving the effectiveness of audits, rather than seeking a method better suited to monitoring such a complex phenomenon. The researcher views this literature as concerned with a perceived execution failure, but would argue that there is, in fact, a fundamental failure in the audit-based approach, in that a current audit regime, even if perfectly executed, would still fail to deliver well-being improvement for workers. No alternative method has yet been agreed upon by academics and practitioners. This is, in the researcher's view, a limitation to the current body of literature on SSCM. The only promising lead was supplied by the three well-being studies using PsyCap metrics with Chinese factory workers (Luthans *et al*., 2005; Luthans *et al*., 2008; Seo and Chung, 2019).

The literature had shown worker interviews by auditors to be undermined by a power imbalance which also appeared to have been a factor in the failure of large-scale worker surveys used previously by the researcher. The researcher perceived the need for a new data-gathering method which would not require face-to-face interactions or involve any intermediation by managers. Daily digital voice diaries appeared to offer this potential, and since no precedents had been found in literature for their use in a Chinese factory, a short pilot was conducted, with 100 workers at one factory.

A longer study, with 466 workers in four factories, followed, during which practical interventions to improve the well-being of the workers would be tested. These were designed based on the need for training and HRM indicated in the Lean theory literature, the importance of training as seen in POB theory and PsyCap theory, and insights from pre-intervention diaries gathered during the pilot and the main study. Diary data and factory-level metrics were then used to identify any impacts. While one aim was to start to help identify what could be measured in factories to ensure the well-being of workers, a significant aspect of this fieldwork was to explore *how* that might be practically achieved.

The researcher believes the diaries were seen to provide workers with the opportunity to comment daily on their well-being, giving them a voice that could be heard by the researcher, without the bias mentioned in the literature discussing audits. This novel method appears to have allowed workers to express themselves freely, while also generating detailed longitudinal data where audits can only provide a series of time-limited snapshots.

5.3. *What* should be measured in factories to support workers' well-being

The researcher regards the well-being of factory workers in China as critical to the SSCM debate. Understanding it would, in the researcher's view, allow businesses buying from global factories not only to manage their social risk and acquire social transparency for the first time, but also to reduce their current reliance on audits. China's labour shortages would seem to create further motivation for any business to seek to understand and support these workers. The link to factory performance and staff retention indicated by the results of the diary research is believed to further reinforce the importance of their well-being.

SSCM literature considers the factory, the buying company and its stakeholders, and the sustainability drivers, barriers and enablers between them. Köksal and Strähle's (2017) conceptual framework outlines these well, but no SSCM literature appeared to consider the drivers, barriers or enablers involving the factory's workers. This researcher argues that those are even more critical to social sustainability, and that while workers are excluded as

stakeholders in a supply chain, both social risk and the associated reputation risk will persist. This thesis therefore adapted Köksal and Strähle's (2017) model (see Figure 2, page 29, above) to include these workers as an important further stakeholder.

The researcher argues that the well-being of Chinese factory workers needs to be brought to the forefront of that debate. To start to understand what might impact it, literature concerning workplace well-being theory was reviewed. Although developed from a western perspective (little would be discovered with a specific focus on Chinese factory workers) this would provide some helpful concepts. The researcher believes this starts to change the conversation in SSCM by looking at factory problems from a worker's perspective.

Assessments of job satisfaction were seen in well-being literature to have typically excluded *frustration*, only recently identified as distinct from *low satisfaction*. Evidence of frustration would appear regularly in workers' diaries. Demotivation is another factor perceived often in the diaries, especially in relation to the operational problems that prevent workers from completing their tasks and drive rework.

While some have portrayed physical working environment (e.g. crowding, noise, heat or dirt) as a major concern, the diaries gathered for this thesis revealed a more complex well-being picture. Most workers did not particularly complain about their physical comfort. While hedonic well-being issues were most often mentioned in respect of work, these usually related to the stress of working on poorly-run production lines where interpersonal friction could lead to noisy clashes:

'I'm really busy these days, rushing to get orders finished before the CNY holiday. Every day I can hear quarrels in another workshop. They're arguing because an upstream team can't provide enough work to the downstream team so they're wasting a lot of time just idle.'

'My machine kept breaking down today. I had to wait for an engineer to come and fix it. I stood around waiting instead of working toward my goals. When he finally came, he shouted at me!'

However, the researcher argues that this fieldwork also revealed that for some workers their factory provides a safe, clean environment while facilitating financial freedom, and considers the main sources of well-being seen in diaries as more accurately classified as eudaimonic. One worker explained:

'Factory work is hard and frustrating. Some days we don't make our targets. But I'm happy to be here. Life was tough in our rural house; the winters were terrible. I'm happy living here with other workers. There's food every day and we have fun in the dormitory. I love getting paid. I want to save enough to return to my village and build us a better house to make all my family's lives easier!'

POB studies increasingly prioritise eudaimonic well-being aspects such as meaning and purpose. The fieldwork yielded frequent such mentions in diaries of eudaimonic well-being concepts. Personal aspiration, seen to be treated as important by western organisational behaviour studies, was evidenced throughout both diary studies. This theme had not been seen in the existing literature on Chinese factory workers.

Luthans and Avolio (2005) observed that many factors influence the well-being of workers, echoing Bandura (1986) who said: 'No one single variable can aspire to have great predictive powers of complex human action'. The diaries revealed a complex web of linked factors influencing a worker's hedonic, eudaimonic and social well-being. These included struggles with separation from family and strains on working relationships. Many had made the sacrifice of a long separation from family to work for a better life with their families later. Hedonic aspects like rework, poor-quality or late raw materials, machine breakdowns, slow colleagues and workers fighting were often mentioned in diaries, but these were seen to more significantly impact a workers' eudaimonic well-being:

'Reworking again today. I am so frustrated as it means I won't meet my targets. When my sewing machine stopped working my team leader shouted at me! I didn't do anything wrong. I haven't seen my family in over a year, my son is growing up, how can I ever save enough money to be with them again if this keeps happening?'

It is the researcher's view that Chinese factory workers are not as unlike the workers in a western cultural environment as some literature might imply. It could be suggested that it is due to their neglect in academic literature that it is assumed that more hedonic factors matter to them, while this diary research shows them most concerned with eudaimonic issues.

The view of the researcher is that not only do audits, and some academics, wrongly prioritise the hedonic aspects of factory life, but that these are themselves misunderstood, and that this thesis shows apparently hedonic well-being factors in this context to be more complex than had been assumed. This suggests to the researcher that audits are not only unsuited to revealing the true picture in terms of workers' well-being but are also failing to monitor the appropriate issues. This was not seen have been previously understood by academics.

PsyCap has been shown to improve both well-being and performance in western workplaces, and the PsyCap theory had outlined some well-being aspects later seen in diaries. These diaries showed hope, a PsyCap component, as clearly motivational for many workers, while a number of workers mentioned an inability to meet their set production targets due to operational problems:

'Because the pre-ordering wasn't done well, I currently have no goods to work on, so I'm wasting a lot of time. It's annoying.'

The diaries also showed that workers were reworking constantly:

'I've been working on the same style and the same production order for a while but my goods still fail the inspection and are returned for rework every time! I've never been able to avoid rework on this bag. I'm fed up today.'

'This new bag has strict requirements and we haven't received much instruction. Today we had to rework them twice. It's so frustrating!'

The researcher argues that no one can outwork the system in their workplace. This was seen to make workers feel their future aspirations were unachievable and time spent living at the factory wasted. One entry summed up the feelings of many workers:

'In 2010, I set myself a goal: to go back to my hometown, reunite with my family, and run a farm. I work hard for this unrealistic dream every day. But it's difficult for me, because I have nothing now.'

Existing social audits do not consider the operational performance of a factory in terms of the well-being of its workers. The researcher believes this data shows empirically for the first time the impacts of poor operational management on the well-being of these workers (see Appendix 4 for more example diary entries).

Optimism, another PsyCap element, also appeared to be impacted by an inability to address these operational difficulties. For example:

'My line leader didn't ask the other workers to bring enough materials from the store room this morning. Now we're standing around without working. I won't meet my targets again today. I'm frustrated. I'll never be able to leave the factory and start my own business if I can't meet my targets.'

Workers' self-efficacy, a further PsyCap element, was also seen to be impacted. Many mentioned struggling to do the work set for them due to inadequate training, while conscious of delaying colleagues:

'The work the team leader gave us today is hard. I have not been shown how to do it and the line's moving too fast. I'm trying to see what the worker next to me is doing but he doesn't seem to know how to do it either. I'm being shouted at by the other workers for being too slow but I can't figure out what I'm doing wrong. Today is really a very hard day.'

Although the importance of training was mentioned extensively in the Lean, POB and PsyCap literature, none had considered the impacts of their work performance on workers' eudaimonic well-being. The researcher believes the data shows that training for workers on

how to perform the tasks set for them is required to support not only their work performance, but also their well-being. No social audit regime evaluated appeared to consider work-skills training for these workers.

The final component of these workers' PsyCap, their resilience, appeared often undermined by supervision style. There were signs in diaries of mistreatment by line leaders as the whole team became frustrated by operational problems in the factories. Anecdotally, these supervisors are typically promoted production line workers with little management experience who receive minimal training or support from their factories. Unable to coach or support the workers, they sometimes resorted to shouting or scolding. Rather than allowing workers to bounce back when goals were not met, this further demotivated them (Luthans *et al*., 2008). It is the researcher's personal observation that HRM is not a priority in most Chinese factories. It rarely extends outside of basic operational aspects or those checked at audit (Luthans *et al*., 2005). Supporting new managers with adequate training is not observed to be common. The diary data appeared to confirm this perception:

'Today we are all struggling to get the new stitching done. It's hard and the fabric is poor quality. No training was given to us, we were just suddenly switched to this line. The line leader keeps shouting at us. He's so mean, he forgets he used to also work on the production line like us! I wish he'd stop shouting and just show us how to do the work better.'

In the researcher's view this shows the key importance of management training for these workers' supervisors. A range of literature mentions that hope can be improved by setting achievable goals for workers. The researcher believes the field research indicates that to achieve social sustainability in factories will require HRM processes such as those for communicating goals. Again, none of the literature reviewed considered monitoring a factory's provision of management training in the interests of social sustainability.

Another revealing element undocumented in the SSCM literature was that the factors impacting these workers' well-being were often social, and included their work relationships as well as those with family and friends. The literature review had shown more recent well-being studies addressing its social aspects. Field data showed relationships in the factories deteriorating, not just with untrained line leaders but also between production-line workers:

'I'm so tired today. The work I did had to be reworked. I was pasting bar codes, in five colours, and when the last colour was done, we found out it was wrong! I had hoped the earlier process's workers were more responsible. If they didn't notice, who's to blame? Maybe the packaging staff?'

Operational problems outside the worker's control were seen to have a wider negative impact as their relationships with line leaders, managers and colleagues became strained, reducing the worker's social well-being. It is the researcher's view, based on this data, that social aspects of factory life are important to these workers. The diaries reflected a need for positive relationships, at work as well as with family or friends. Strains on these relationships appeared to undermine workers' self-worth and to demotivate and frustrate them, both damaging their eudaimonic and social well-being and further reducing their ability to meet their targets. This is not an insight mentioned in SSCM literature or reflected in what is measured by a typical factory audit.

It is argued that this field research reveals for the first time that operational problems in factories, including those due to inadequate training and management, have impacts far greater than simply impeding workers' immediate progress. Their inability to meet the short-term factory goals on which their life goals depend also undermines their self-worth, demotivating them and reducing their eudaimonic well-being.

Literature on Lean theory did show training supporting the well-being of workers, and PsyCap literature showed a positive relationship between job-specific training for workers and their self-efficacy in particular (Earley, 1994; Luthans et al., 2013; Guan and Frenkel, 2018). Some workers participating in the main study were given task-specific skills training in the hope that this would support not only their technical expertise but also their self-efficacy, boosting their optimism as they started to experience success in their tasks. Their line leaders were also trained in the hope that this would lead to more positive and supportive feedback and achievable goals, potentially improving workers' resilience and nurturing their hope.

Echoing the literature on Lean, POBs and PsyCap theory, the field research showed the importance of training for both workers and their line leaders. The extent to which different qualitative second-order themes were mentioned in diaries after training suggested some significant changes in focus, with fewer references to operational problems like production delays and rework, and workers more often reporting feeling appreciated, and less often feeling devalued by colleagues:

'We've been receiving training for a while, and I really feel something's changing. It's like the team's more united with fewer quarrels! Maybe it's because we haven't had so much rework recently. People aren't wasting time blaming others. I hope we can maintain this new harmony and eventually increase the team's performance and make more bags.'

'I feel suffused with energy! Today we were taught a new packaging method and we learned it quickly. Now we can pack more products at once! Thank you, supervisor. I wish every day at work was so easy and enjoyable.'

'Today the team leader assigned me a special task for a big order. He taught me the process and encouraged me to find ways to speed it up. I found this difficult at first so I went to watch another team. After seeing a few dozen done, I figured out a trick to help everyone to do it faster. Because of this he's applied for me to have a reward of 200 yuan. I guess he appreciated my work today!'

The researcher argues that the diaries show these workers' optimism and self-efficacy starting to improve as they received the training they needed and began to meet their production targets. This intervention was also seen to have improved their eudaimonic well-being as they felt more able to work toward their goals for a better future.

'Today I'm in a good mood. The monthly performance results came out and I've got more than 100 points. Many of my teammates have similar scores. We all feel blessed and are proud of our team!'

'I'm excited this month as I've met my targets for the first time! My family at home are going to be so happy as I can now send them some extra money. The training's really helped me to do my work better and faster. I think my team leader has also noticed. He said I was doing well yesterday!'

The interventions' most significant effect proved to be in reducing indications of negative sentiment. Since psychological states are not visible, 'research needs to identify visible practices that create the environment needed for PsyCap to flourish' (Luthans *et al*., 2008). It is the view of the researcher that the training tested was shown to be in the interest of workers' well-being and should therefore be included in CSR evaluations. If the businesses that audit factories were to monitor appropriate training for workers and their line leaders, this might start to support workers' well-being by reducing negative sentiment in their factories. This insight, in the researcher's opinion, changes how audits should be viewed – they could be adding value by considering factors indicative of workers' well-being rather than just being a tool for self-monitoring with a view to legitimising business decisions.

It is the researcher's belief that this thesis brings Chinese migrant factory workers to the forefront of the social sustainability debate for the first time, presenting a new perspective which indicates that their well-being is undermined, not by physical, hedonic factors but by the impacts of operational issues on their aspirations for themselves and their families. The researcher perceives that these people's work has meaning for them and they value productive work when it is paid well. Inability to get this work done due to factors beyond their control undermines their eudaimonic well-being. This dynamic had not been considered in the

literature seen. The researcher contends that it is an important insight which should change how factory conditions are viewed and influence any attempts to manage social risk.

Successful management of social risk in a factory will, in the researcher's view, require consideration of its operational process management. This had not been connected to the well-being of workers in either the well-being or SSCM literature seen. It is the researcher's belief that by showing how operational issues in factories impact the well-being of their workers, this research starts to connect the SSCM and workplace well-being theories.

It is the view of the researcher that if these workers were included as stakeholders in the discussion of SSCM, the resulting understanding of the drivers, barriers and enablers to their improved well-being could significantly help businesses to achieve social sustainability in their global supply chains. This thesis offers the first data which allows for the stakeholder theory within SSCM to start to consider those drivers, barriers and enablers.

While previous studies have suggested that 'self-efficacy can be improved by training, relationships or encouragement and support from managers' (Du *et al.*, 2015; Rego *et al.*, 2019) the results of this research uniquely suggest it might also be improved through more operational efficiency. Self-efficacy might also, therefore, be practically addressed by working to resolve operational problems.

PsyCap literature shows improved self-efficacy and optimism leading to better work performance but this thesis indicates that the situation is more complex and nuanced. Of the performance indicators, the rework rate was most significantly improved, from 0.72% to 0.61%. Rework rates are driven primarily by quality of workmanship rather than systemic efficiency. That product-attrition and order-delay rates were less improved, (from 0.09% to 0.08% and from 1.38% to 1.17% respectively), reflects the fact that operational performance and overall management could not be addressed by intervention in this context. These workers' PsyCap was seen to rely to some extent on factors not addressed by the interventions. While the trainings had started to solve some problems, improving their sentiment and therefore their PsyCap, no worker can outwork a system:

'Things were going so well this morning. We'd had the daily training, we all knew what to do. I was working fast and hitting my targets when we ran out of materials. Why didn't they plan ahead, and bring more from the warehouse yesterday? I heard one worker say there were delays to deliveries. I'm annoyed as it wasted time, and now we're not meeting today's targets!'

'Today I was working fast and so was my team-mate. Yesterday we had training and now we can work really fast. Then my machine broke! The engineer didn't come so I stood idle all afternoon. I'm so cross; another day without meeting my targets!'

The researcher proposes training factory owners or managers in operational management and process planning to address some of these challenges.

While improving well-being, these interventions had also improved some factory performance indicators. It is argued that the demonstration of a link here, where bias was not an issue, changes how workers' well-being is seen. Reported worker attrition rates had also improved significantly after training, from 3.87% to 1.36%. The view could be taken that this was achieved by starting to improve workers' PsyCap and eudaimonic well-being. Well-being improvement would be valuable for moral reasons alone, but this is a potentially more powerful motivator for businesses to improve workers' well-being, especially in light of the concerns in China's factories about securing sufficient workers.

The researcher believes this research presents strong evidence that worker attrition rates could be reduced through training workers and their supervisors, not only improving workers' well-being but also reducing the costs associated with hiring and training new workers. Reducing turnover leads to more experienced workers, leading to better production, a source of competitive advantage for factories. This researcher argues that adding questions to audits to focus attention on the provision of training might, by improving factory performance, reduce the frustration which can lead workers to leave their jobs. A worker wrote in their diary:

'I used to think of the training session in the regular morning meeting as a mere formality, but actually, it's working! I've heard fewer complaints in the workshop about difficult products recently, and more laughter. Even those who used to keep saying they were going to leave the factory have suddenly shut up and I still see them in their seats, working away. Well, that's interesting!'

The insights from the interventions add to the SSCM literature by suggesting the drivers for workers while contributing to the PsyCap theory by deepening the understanding of the causality between PsyCap elements. Workers' self-efficacy and optimism can be enabled by skills training, and their resilience and hope by training their line leaders to support and encourage them:

'The line leader really helped me today. He encouraged me to keep trying and helped me figure out why I kept jamming the machine. I'll still need to do some rework tonight after my shift but I feel I've learnt something today and that tomorrow will be better.'

'We need to rework tonight but I'm happy. We're all working together as a team and laughing and chatting. The team leader thanked us and encouraged us to get it done. I feel we can still hit our targets this week!'

The researcher believes this research starts to indicate that interventions at line level, like training for line leaders and workers, can be an enabler of social sustainability as defined by Köksal and Strähle (see Figure 4, above). Based on data collected for this thesis the researcher suggests a working model (Figure 11, below) to support the improvement of workers' well-being, improving productivity.

Figure 11: Researcher's model linking SSCM to workers' well-being theory
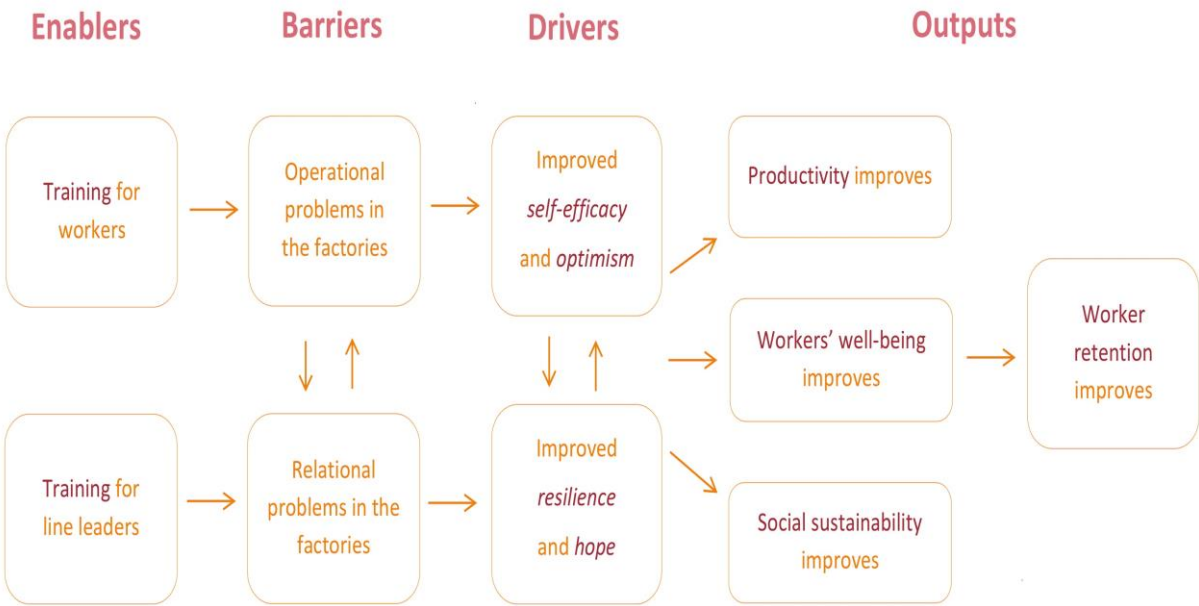
The researcher agrees with academics who have observed that social sustainability is neglected in sustainability literature, and concludes that there has been insufficient information to ascertain what specific measures might be introduced to support it. Academic social sustainability literature had been perceived to focus mainly on stakeholders other than factory workers. The researcher is of the opinion that this fieldwork revealed for the first time the real problems impacting workers, highlighting areas where the researcher believes social audits should focus. Action research showed training both workers and their line leaders potentially able to address some of the operational and relational problems seen. It suggests that building HRM which ensures appropriate training can improve workers' well-being, reducing worker attrition, and that CSR regimes should seek to support factories by monitoring the presence of HRM processes which ensure regular training not only for the workers but for everyone in the factory. The researcher further argues that the systemic

operational problems seen might be resolved by helping factories with operational planning and management training, which their client businesses could support. Procedures like the regular servicing of machines and the quality-checking of raw materials might be easily audited.

The researcher believes this field research is transformational, in that the situation in Chinese factories is presented for the first time from the perspectives of workers, rather than via an interviewer or auditor. Where literature had demonstrated a lack of understanding of what matters to workers, and hence both what to monitor and how in this challenging environment, this research both suggests a new way to begin to address *how* to collect the required information and reveals some issues which should potentially be measured. The researcher argues that the method enabled the workers to reveal what matters to them, avoiding the fundamental failure of audits to give the workers a genuine voice about their well-being concerns.

Chapter 6. Conclusions

6.1. Answering the research questions

Although workers' well-being and SSCM have both been extensively studied in the past few decades, the well-being of Chinese factory workers and its implications for SSCM have remained relatively unexplored. This thesis investigated and discussed the factors impacting these factory workers and their well-being in detail. The research aimed both to support social sustainability efforts and to discover if workers' well-being improvement could boost factory performance.

The literature review had indicated failures to support the well-being of these workers in the attempts of businesses to self-regulate through audit-based regimes, plus a lack of consensus on how well-being might be measured. This prompted the creation of a novel research method and two research questions to be tested in the field: *What are the factors that influence well-being for Chinese factory workers?* and *How does workers' well-being influence factory performance?*

The method was designed based on established challenges to gathering data in Chinese factories. A previous survey-based study of workers had been unsuccessful and the literature described audits, which may utilise surveys or interviews, as failing to provide full transparency. A novel digital diary method designed to remotely gather almost real-time information discreetly from workers was tested in a short pilot study.

Data collected began to suggest answers to the first research question, which would be confirmed by the early diary data from the main study. Three interdependent aggregate dimensions of the well-being of workers would be identified by the fieldwork: 1) social displacement, struggles with factory life and trade-offs with long-term life-goals; 2) frustration and demotivation due to operational problems impacting remuneration and 3) relationship strain impacting self-worth. Day-to-day operational problems were understood to hinder productivity leading to missed targets and loss of remuneration, which impacted workers' life goals, in turn undermining working relationships. Workers' inability to influence these operational issues sometimes led them to lose hope.

The literature and combined early diary data suggested two training interventions to address some of the workplace operational and interpersonal problems identified. Testing these showed training improving both well-being and performance in the factories. Most significantly, it appeared to have reduced negative sentiment among workers. Analysis of

second-order themes in the diaries of workers indicated that training had both improved their sentiment and changed their outlook, enhancing their well-being. To address the second research question, the main study also collected factory performance data throughout. These metrics also indicated improvements to overall factory performance after training, resolving the second research question. Metrics driven primarily by workmanship, rather than by systemic efficiency, were particularly improved. Worker attrition rates were also lower after intervention. The second research question was answered: there were indications that the well-being interventions had positively impacted some aspects of factory performance.

This research had confirmed a gap around Chinese factory workers' well-being, both in the SSCM literature and in the auditing regimes predominantly used by western businesses to monitor their global supply chains. The innovative use of a diary method in some of their factories had produced findings which, in the view of the researcher, can improve the general understanding of impacts on the well-being of Chinese factory workers.

As presented in the proposed model, workers' self-efficacy, optimism, hope and resilience can each be seen as drivers of well-being. PsyCap, HRM and Lean theories had all indicated that self-efficacy and optimism might be enabled through regular work-skills training and that resilience and hope might be enabled by training line leaders to set achievable goals and to be more positive and supportive. The training tested was confirmed as a potential enabler which mitigated the impact of barriers such as frustration due to operational failures, demotivation and deteriorating relationships.

The factory-level metrics also indicated improvements to worker attrition. This provides a strong incentive, both for buying businesses seeking social sustainability and for factories needing to retain experienced staff, to work to improve not just the hedonic well-being factors typically monitored by audits but also the eudaimonic well-being of workers.

The research therefore answers both research questions and provides a foundation for future research.

6.2. Contributions to the theory and knowledge

This research advances the knowledge with both an understanding of workers' well-being in Chinese factories, hitherto missing from SSCM, and a more nuanced approach to the theory on workers' well-being.

It makes three distinct contributions. First, it is novel in achieving transparency into the concerns of workers in Chinese factories by hearing directly from them. The literature had

shown that audits had not provided the transparency required in supply chains and that too little was known about the factory workers, who had been left out of the SSCM debate on social sustainability.

Its second contribution is to indicate, using data collected direct from these workers, that what matters most to them are not the physical hedonic well-being factors typically monitored through audits or investigated in most current SSCM literature. Eudaimonic factors, which are more difficult to measure and require particular interventions, were seen to have had a greater impact on their well-being. Unlike the existing SSCM literature, it highlights the complex relationships of workers with their colleagues and line leaders, bringing empirical evidence and detail to a discussion long overdue. By learning first-hand about impacts to these workers' well-being the research uncovers some drivers, barriers and enablers to social sustainability in their factories. This thesis therefore makes novel links between SSCM and the workplace well-being theory. It creates a basis for further theory-development concerning supply-chain social sustainability, specifically around workers and impacts on their well-being (Shepherd and Rudd, 2014).

A further contribution is to the literature on PsyCap theory, which has mainly focused on western workplaces. As discussed in Chapter 2, the two studies by Luthans testing PsyCap in Chinese factories had used survey methods that were susceptible to bias and lacked longitudinal data (Luthans *et al*., 2005; Luthans *et al*., 2008). This new fieldwork contributes to the PsyCap literature by using workers' diaries over an extended period, to allow for a more reliable well-being assessment, and each factory's overall performance metrics, unlikely to be clouded by work relationships. Using long-term daily data allowed the researcher to infer causality while measuring workers' well-being through a PsyCap lens longitudinally, an aspect also missing from the earlier studies (Podsakoff *et al*., 2003).

For the first time in PsyCap studies the research indicated that the well-being of workers was markedly impacted by both operational conditions and relational factors in their factories. It revealed that most are motivated by hopes and goals for their families' future, also presenting in-factory relationships as a source of well-being. The diaries showed a worker's inability to perform the task given to them impacting their self-efficacy and optimism, while resilience and hope were undermined by poor treatment by line leaders and managers, indicating that these workers' well-being has an important relational component.

6.3. Implications for social sustainability practice

Several practical implications for social risk management have emerged from this research. Although no theoretical contribution was made to the Lean literature, insights which developed from reviewing existing literature included the business potential of paying attention to building and strengthening the eudaimonic well-being of a factory's workers through improved HRM processes, such as a set cadence for worker training to enable improved self-efficacy. The deep human resource potential of China would seem an overwhelming opportunity for any manufacturing manager but reducing turnover is vital and workers' well-being must be prioritised to achieve improved retention (Luthans *et al*., 2008).

It is also critical to improve supply chain transparency so that global supply chain managers can understand how workers are actually experiencing the conditions in their suppliers' factories. Using this novel method to gather qualitative data is believed to have expanded the understanding of Chinese factory workers' lives far beyond the data previously collected using conventional audits or surveys. The information discovered could start to support the efforts of practitioners to understand what is happening in global supply chains, helping to address social sustainability's problem with transparency around workers. It can also potentially help businesses to approach social risk management more constructively with their suppliers. The relationship between eudaimonic well-being – which can be improved with training – and performance could assist businesses wanting to increase not only suppliers' performance, helping both the workers and their factory, but also their transparency. Training as a way to support social sustainability also offers the benefit of being visible to auditors.

The training interventions were seen to have influenced both well-being and performance by addressing operational problems and strained working relationships, generating a changed outlook. Training both improved workers' sentiment and addressed some of the operational and relational problems impeding factory performance. The results indicated training as potentially able to improve rework and worker-attrition levels in similar factories, a strong incentive for both factories and their client businesses. The prospect of improved factory performance incentivises businesses to improve the well-being of workers, also meeting stakeholders' sustainability requests, a further potential source of competitive advantage.

Workers' training and line leaders' training had indicated an improvement to workers' sentiment and outlook. While previous studies had suggested improving self-efficacy through interpersonal interventions like training, encouragement and support, this research uniquely

tested their potential in Chinese factories, also finding novel indications that it might also be improved by reducing operational inefficiencies.

6.4. The practical implications of the novel research method

A significant contribution of this research is the design and testing of a novel method for collecting data both in Chinese factories and potentially in other similarly challenging environments. Hearing from workers in their own words was an important factor of this research. Unlike with audits, workers' own perspectives were shared in first-hand accounts. As shown in the literature, the audits relied upon for decades to collect data from the workers in a factory have continued to be undermined by factors including culture, the working environment and imbalances of power. This difficulty with hearing direct from the workers may be one reason why they have been neglected in research and largely left out of the SSCM debate. Uniquely to SSCM, the custom-designed method created for the fieldwork described in this thesis provided longitudinal data direct from workers, uncovering new insights.

It might be suggested that the use of social media in academic contexts is in its infancy. This research used social media with diary analysis in a challenging setting with hard-to-reach subjects. The use of voice messages helped to bridge literacy concerns while making it easy for workers to contribute without needing to set aside too much time. Allowing them to leave a diary entry at any interval in their day also mitigated recall bias. While, particularly when traditional methods such as surveys are used, participant engagement and field data quality most usually tends to deteriorate, these diaries improved in quality over time and the information shared became richer and more detailed (Arfken and Balon, 2011). The researcher is confident that the approach offers significant advantages but feels it needs to be supplemented with some personal interaction to maintain engagement as diarists become used to the method. This insight may be useful to other researchers.

The diaries provided almost real-time insights into factory life and the workers' well-being. It is reasonable to argue that their success suggests the potential for diaries to compensate for some of the shortcomings of conventional data collection in Chinese factories. The research indicates a digital diary method as a potential way of reliably assessing conditions for factory workers, allowing them to be at the forefront of the debate. This is something which urgently needs to be developed. It is hoped that this research proves a helpful start to that journey.

6.5. Limitations of this research

This research is, of course, not without limitations.

The qualitative methods adopted have some acknowledged limitations, as described in detail in Chapter 3. Although steps were taken to mitigate methodological limitations, the findings of the research are also nevertheless interpretations by a single researcher of subjective data provided by its subjects. While the factories and workers involved were judged reasonably representative of Chinese final-assembly factories, the interpretivist view is that every situation is specific. There are therefore limits to the potential for generalising the results to other settings or other cultures. The diaries were also very personal to the workers but had to be interpreted impassively and treated as data. The approach described by Gioia and Corley (2013) was adopted, but this nevertheless raises questions about subjectivity in the coding and interpretation. The hope is that the volume of diary data collected has mitigated any such issues.

The second area arises from a problem identified in the literature: that much existing social sustainability theory had left out the workers, with the well-being of factory workers in China particularly neglected. The systematic stage of the literature review had intentionally focused on factories and supply chains and the choice of keywords may possibly have excluded relevant material from closely-related theoretical domains. Although the snowballing approach applied in the more thematic stage covered a broader area it may also have excluded some relevant literature. A lack of appropriate research tools and methods also limited the basis for theory development and the potential to test a wider range of interventions for use by practitioners, shifting the focus onto developing a method (Shepherd and Rudd, 2014; Shepherd and Suddaby, 2017).

A third area is that the 'limitations of any field study are magnified when the realities of the concepts and techniques developed in one culture are applied to another culture' (Luthans *et al*., 2005). In the case of this research, the *concepts* included well-being theories originally developed by western academics. Realities included a Chinese factory environment. Although many papers by Chinese academics informed this work, no Chinese theoretical workplace well-being literature had been found. Despite the use of an innovative research method to avoid the impacts of both practical factors in the environment and its imbalances of power, there remained, inevitably, factors beyond the control of the researcher. Examples include a very large order placed with a factory with a very short lead-time, which could have led to excessive overtime and exhausted workers, and a fire at a factory which then had to drop out

of the research. Such factors were not necessarily always reported yet may have impacted the results. The hope is that the longitudinal method and the 12-month duration of the main study have mitigated this.

The fourth limitation was the issue with translation accuracy seen in most cross-cultural research. In the host factories, as is typical in Chinese factories, there were many migrant workers so data was contributed in various languages and dialects. As outlined in Chapter 3, the Brislin (1980) guidelines on re-translation were followed where possible and native Chinese-speakers checked the English versions for accuracy and to reconcile any discrepancies arising from the worker's day-to-day language. This re-translation method was deemed the most rigorous available option.

A fifth limitation was that although the training interventions were developed in the hope of influencing both well-being and factory performance, there was a limit to what could be achieved. While they were able to target some factory inefficiencies, they could not solve everything. The research indicated that to sustainably influence and improve the well-being of workers, multiple factors would have to change. Some of the inefficiencies seen were systemic. Problems such as machine failures were not addressed by intervention, as this would have required the factories to make financial investments and significant changes to their processes. No intervention had attempted to addressed social isolation. The obvious intervention – to allow more holidays substantial enough to permit travel – would have had to be mandated by the factory management. Working toward well-being would require more systemic interventions and sustained engagement over time. It would require both solutions to operational problems and improved leadership and HRM.

This approach is also likely to be effective only in a context where the workers value improvements to performance. Improving a factory's performance did not appear to strongly influence workers' happiness, but it did reduce their frustration, contributing to an improvement in general well-being. This might not have been the case if the workers had been more concerned with their hedonic well-being. Where the well-being drivers are primarily hedonic, the types of intervention likely to improve it – such as more comfortable working conditions – may be unrelated to factory performance. This suggests that the *happy worker–productive worker* thesis is more likely to hold true in situations where the factors important to the well-being of workers are also related to the performance of the business.

6.6. What happened after the research was concluded

The researcher would return to the factories six months after the conclusion of the main study to consider the longer-term impacts of the research in the participating factories. Only informal observations and conversations were conducted. The lasting effects appeared to be mixed. Many workers (68%) had continued to keep their diaries after the research had ended and communicated to the researcher that it was a daily routine they enjoyed. The researcher had therefore kept this communication channel open for them, although their entries were no longer captured and coded.

One (non-intervention) factory had closed in 2021 due to the impact of the pandemic, but the other three had continued throughout. Management of the two intervention factories reported many audits (up to two per week) in the interim, and that recruiting and retaining workers had become increasingly difficult. One had continued with the training as it had been seen to support its business results. One had changed several managers after the national holiday and had only continued the training with the original ones. The management there indicated that they wanted to try to restart the training as they also felt it had been very helpful.

6.7. Recommendations for future directions

With the continued growth of manufacturing in developing countries, understanding the factory workers and their well-being is important to SSCM and to businesses needing transparency in their global supply chains. The findings of this research provide the following insights for future research.

The method in particular suggests investment and further work. The classification of diaries into categories using Gioia's grounded coding method merits further testing. One concern mentioned by other academics is that it can lead to 'force fitting data into the first-order/second-order rubric when not called for', diminishing the value of the data and the potential for using different approaches to further develop themes (Bansal and Corley, 2011; Gioia *et al*., 2013). The larger data sample collected for the main study did produce more interesting results, but the concept offers potential for further development.

Training was found to be the only feasible intervention for this research, but literature and the diary data also suggested other interventions that might merit testing. The main study included training for workers' line leaders, therefore incorporating some degree of organisational intervention as well as that at individual level, but this could usefully be expanded upon by considering further organisational interventions. Factory operational

process improvements like regular machine maintenance and raw material inbound quality checks might also be considered, as could improving some social aspects of factory life.

This research did not seek to understand the HRM processes or programmes in place in the factories. Future research might also consider hiring processes and HRM practices, exploring further ways to facilitate anonymous worker feedback and identifying training gaps and other inefficiencies. This could support additional interventions to improve the well-being of workers and potentially factory performance. Improved worker feedback mechanisms could support the building of more robust HRM processes and improve workers' PsyCap.

Although there were many Chinese people supporting this work, literature by academics publishing only in Chinese languages was not reviewed and Chinese academics were not sought-out or actively involved. This might suggest a future direction for academics aiming to investigate the implications of this work more deeply in China. The research also requires testing in locations beyond China's consumer-goods final-assembly factories. Specific issues and cultural differences impacting workers in China were found. For this research to truly support social sustainability, the well-being of factory workers in other countries would also require attention. Similar research in a range of other locations, including some in the west, might suggest different interventions as well as providing new location-specific learnings.

The primary focus of this work was to better understand the well-being of workers in global supply-chain factories. A connection to performance has been proposed in the literature and defining the nature of any link became a secondary objective. Other researchers might choose to begin by focusing more fully on this connection to pursue a comprehensive literature review exploring the applicability of the various theories to the workers in Chinese factories. Future research might consider using insights from this research to inform the redesign of audits to potentially better support the well-being of workers. It is reasonable to propose that such a redesign might also positively impact factories' performance. This work could therefore initiate changes to audit regimes and the manner in which businesses self-regulate.

Supply chains can never be socially sustainable while the people working in factories are ignored as stakeholders and excluded from the debate. Unless businesses learn what impacts the well-being of the workers in their suppliers' factories, they will continue to overlook the social impacts of global supply chains on communities and the people within them. After decades of auditing, they will still be unable to meet their commitment to providing the transparency required by stakeholders.

The researcher observed in these factory workers the same objectives as the other stakeholders in the supply chain: to produce products to a high standard and as fast as possible. They take pride in their work, which is important to them. These workers are critical stakeholders in attempts to create more socially sustainable global supply chains. Change is difficult, but it is hoped that the insights in this thesis provide for a more nuanced understanding which will allow the well-being of these workers and its impacts on the performance of their factories to be considered in a new light.

Appendices

Appendix 1: Full bibliometrics from the two-stage literature review

Article subject	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
Journal title		**223**	**110**	**101**	**60**	**59**	**29**	**26**	**21**	**14**	**13**	**9**	**3**	**3**
Journal of Business Ethics	30	22	1	6	1									
International Journal of Operations and Production Management	18	8	2	1	6		1							
Journal of Cleaner Production	17	10			6				1					
International Journal of Human Resource Management	13			5		2	4		2					
International Journal of Production Economics	13	9		1	3									
Journal of Management	13		1	6		4					1	1		
Journal of Organizational Behavior	13		4	3		3					2	1		
Journal of Applied Psychology	9		2	6	1									
International Journal of Physical Distribution and Logistics Management	8	8												
International Journal of Production Research	8	3		1	3	1								
Journal of Happiness Studies	8		7			1								
Leadership Quarterly	8			8										
Supply Chain Management	8	8												
Sustainability	8	7		1										
Academy of Management Review	7	4		2								1		
Industrial and Labor Relations Review	7	1	1	1	1		2					1		
Journal of Personality and Social Psychology	7		2			3				1			1	
Journal of Supply Chain Management	7	7												
Academy of Management Journal	6		2	2							2			
Administrative Science Quarterly	6	1	1	2		1			1					
Social Indicators Research	6		4					1		1				
Strategic Management Journal	6	1	1	3								1		
Modern China	5						2	3						
Personnel Review	5	1	2	1					1					
World Development	5	3						2						
British Journal of Industrial Relations	4	1		1			2							
Corporate Social Responsibility and Environmental Management	4	4												
Human Resource Development Quarterly	4					4								
Human Resource Management	4	1		2			1							
Journal of Manufacturing Technology Management	4	1	1		2									

Article subject	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
Journal of Occupational and Organizational Psychology	4		1	1		1							1	
Journal of Occupational Health Psychology	4		1		2	1								
Journal of Positive Psychology	4		4											
Politics and Society	4	3		1										
Personnel Psychology	4			2		2								
Psychological Bulletin	4		2			1					1			
Accounting, Auditing and Accountability Journal	3	3												
American Economic Review	3	1		1					1					
Business Strategy and the Environment	3	3												
China Journal	3	1					1	1						
China Quarterly	3							3						
Chinese Economy	3	2		1										
Development and Change	3		1			2								
European Management Journal	3	2			1									
International Journal of Environmental Research and Public Health	3		3											
Journal of Business and Psychology	3			3										
Journal of Chinese Human Resources Management	3			2			1							
Journal of Human Resources in Hospitality and Tourism	3		1						1	1				
Journal of International Business Studies	3	1		1		1								
Journal of Leadership and Organisational Studies	3			3										
Journal of Managerial Psychology	3		1	1		1								
Management Decision	3	1			1	1								
New Technology, Work and Employment	3	1	1		1									
Social Responsibility Journal	3	3												
Academy of Management Executive	2			1						1				
American Psychologist	2		1							1				
Annual Review of Psychology	2			1							1			
Business and Society Review	2	2												
Business Process Management Journal	2	1			1									
California Management Review	2	2												
Corporate Communications	2	2												
Corporate Governance	2	2												
Career Development International	2					1					1			
Employee Relations	2		1				1							
Fashion Theory	2	2												
Global Policy	2	1					1							
Global Social Policy	2	2												
Group and Organization Management	2										2			

Article subject	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
Human Factors and Ergonomics in Manufacturing	2				2									
Harvard Business Review	2	2												
International Business Review	2		1	1										
International Entrepreneurship and Management Journal	2	1				1								
International Journal of Advanced Manufacturing Technology	2	1			1									
International Journal of Lean Six Sigma	2				2									
International Journal of Management Reviews	2			1								1		
International Journal of Manpower	2		1	1										
International Journal of Occupational and Environmental Health	2	1			1									
International Journal of Productivity and Performance Management	2	1			1									
International Journal of Quality and Reliability Management	2	1			1									
International Journal of Retail and Distribution Management	2	2												
International Journal of Sociology	2				2									
International Journal of Social Psychiatry	2		1			1								
Industrial Relations	2		1				1							
Journal of Business Research	2	1				1								
Journal of Economic Behaviour and Organization	2		2											
Journal of Management Studies	2					1					1			
Journal of Occupational Health	2		2											
Journal of Operations Management	2	1			1									
Journal of Organisational Behaviour Management	2					2								
Journal of Workplace Learning	2				2									
Leadership and Organizational Development Journal	2				1	1								
Management Science	2					1					1			
Measuring Business Excellence	2	1		1										
Organization Science	2		1										1	
PLoSOne	2		1			1								
Production and Operations Management	2	2												
Review of International Studies	2	2												
Sensors	2	1	1											
Safety Science	2								2					
The Learning Organization	2				2									
Work, Employment and Society	2					1	1							
Academy of Management Annals	1		1											
Academy of Management Perspectives	1			1										

Article subject	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
American Sociological Review	1	1												
Annals of Operations Research	1	1												
Annals of Public and Cooperative Economics	1				1									
Annual Review of Organizational Psychology and Organizational Behavior	1					1								
Anthropological Quarterly	1							1						
Asia Pacific Business Review	1			1										
Asia-Pacific Journal	1		1											
Asia Pacific Journal of Marketing and Logistics	1							1						
Asian and Pacific Migration Journal	1							1						
Asia-Pacific Psychiatry	1		1											
Applied Ergonomics	1		1											
Applied Mathematical Modelling	1	1												
Applied Psychology	1		1											
Applied Research in Quality of Life	1							1						
Asian Development Review	1		1											
Asian Journal of Comparative Law	1		1											
Asian Journal of Comparative Politics	1							1						
Asian Journal of Social Psychology	1		1											
Asian Journal of Women's Studies	1		1											
Asian Social Work and Policy Review	1					1								
Behaviour Research and Therapy	1					1								
British Journal of Social Work	1		1											
British Medical Council Medical Genetics	1								1					
British Medical Council Psychiatry	1					1								
British Medical Council Research Notes	1								1					
Buildings	1		1											
Business and Management Studies	1	1												
Business and Society	1	1												
Business Ethics European Review	1	1												
Business Ethics Quarterly	1			1										
Business Horizons	1	1												
Business Research	1	1												
Business Review	1								1					
Chemical Engineering Research and Design	1				1									
Chemosphere	1		1											
Chinese Sociology and Anthropology	1							1						
Chinese Management Studies	1			1										
Community Mental Health Journal	1					1								

Article subject	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
Computers and Industrial Engineering	1			1										
Computer Speech and Language	1		1											
Competition and Change	1	1												
Counseling Psychologist	1									1				
Critical Asian Studies	1						1							
Critical Perspectives on International Business	1	1												
Consulting Psychiatry Journal	1			1										
Decision Support Systems	1	1												
Dissent	1		1											
Dependency and Valency	1		1											
Economic and Industrial Democracy	1						1							
Employee Responsibilities and Rights Journal	1	1												
Energies	1	1												
Environmental Health and Preventative Medicine	1		1											
Environment Systems and Decisions	1	1												
Environmental Quality Management	1	1												
Epidemiology and Psychiatric Sciences	1		1											
Erkenntnis	1		1											
European Journal of Operations Research	1	1												
European Journal of Purchasing and Supply Management	1	1												
European Psychiatrist	1					1								
Evidence-based HRM	1		1											
Extractive Industries and Society	1					1								
Frontiers of Psychiatry	1			1										
Futures	1	1												
Geoforum	1		1											
Global Business and Organizational Excellence	1			1										
Global Business Review	1	1												
Health and Quality of Life Outcomes	1		1											
Human Relations	1	1												
Human Systems Management	1	1												
Human Resources Development Review	1			1										
IEEE Transactions on Professional Communication	1									1				
Indian Journal of Positive Psychology	1					1								
Industry and Higher Education	1				1									
International Archives of Occupational and Environmental Health	1								1					
International Food and Agribusiness Management Review	1		1											
International Health	1		1											

Article subject	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
International Journal of Business and Commerce	1	1												
International Journal of Business and Economic Development	1	1												
International Journal of Comparative Labour Law and Industrial Relations	1	1												
International Journal of Educational Management	1		1											
International Journal of Entrepreneurial Behavior and Research	1		1											
International Journal of Hospitality Management	1					1								
International Journal of Industrial Ergonomics	1		1											
International Journal of Industrial Organization	1	1												
International Journal of Information Management	1			1										
International Journal of Labour Research	1	1												
International Journal of Logistics Management	1	1												
International Journal of Occupational Safety and Ergonomics	1		1											
International Journal of Organizational Analysis	1			1										
International Journal of Product Lifecycle Management	1	1												
International Journal of Research and Marketing	1	1												
International Journal of Training and Development	1									1				
International Journal of Urban and Regional Research	1							1						
International Journal of Wellbeing	1										1			
International Journal of Women's Health	1		1											
International Labor Review	1			1										
i-Manager's Journal of Management	1				1									
Industrial Health	1		1											
Industrial Marketing Management	1	1												
Industrial and Organizational Psychology	1												1	
Intellectual Discourse	1		1											
Journal of the Academy of Marketing Science	1	1												
Journal of Adolescent Research	1							1						
Journal of Applied Economics and Business Research	1			1										
Journal of Brand Management	1	1												
Journal of Business Continuity and Emergency Planning	1	1												
Journal of Business Economics and Finance	1		1											
Journal of Business Logistics	1	1												
Journal of Business Strategy	1	1												
Journal of Chinese Entrepreneurship	1			1										
Journal of Change Management	1											1		
Journal of Consulting and Clinical Psychiatry	1		1											

Article subject	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
Journal of Consumer Affairs	1	1												
Journal of Corporate Citizenship	1	1												
Journal of Creative Behavior	1					1								
Journal of Consumer Research	1	1												
Journal of Contemporary Asia	1						1							
Journal of Economic Perspectives	1	1												
Journal of Educational Policy	1								1					
Journal of Education for Sustainable Development	1	1												
Journal of Family and Economic Issues	1							1						
Journal of Fashion Marketing and Management	1	1												
Journal of Head Trauma Rehabilitation	1		1											
Journal of Healthcare Leadership	1				1									
Journal of Industrial Relations	1		1											
Journal of Industrial Economics	1	1												
Journal of Infection and Public Health	1								1					
Journal of Intelligent Manufacturing	1								1					
Journal of Labour Economics	1		1											
Journal of Leadership, Accountability and Ethics	1			1										
Journal of Management and Organiation	1			1										
Journal of Marketing	1	1												
Journal of Marketing Management	1	1												
Journal of Marketing Research	1	1												
Journal of Occupational and Environmental Hygiene	1								1					
Journal of the Operational Research Society	1			1										
Journal of Operations and Supply Chain Management	1				1									
Journal of Organisational Change Management	1											1		
Journal of Organizational Psychology	1										1			
Journal of Personality	1		1											
Journal of Physical Distribution and Logistics Management	1	1												
Journal of Political Economy	1			1										
Journal of Psychology and Christianity	1		1											
Journal of Psychology in Africa	1			1										
Journal of Public Health Policy	1			1										
Journal of Purchasing and Supply Management	1	1												
Journal of Research in Personality	1		1											
Journal of Retailing and Consumer Services	1	1												
Journal of the Textile Industry	1	1												
Journal of Value Enquiry	1		1											

Article subject	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
Journal of World Business	1			1										
Journal of Work and Organizational Psychology	1		1											
Kybernetes	1			1										
Labour Economics	1			1										
Labour History	1							1						
Logistics Research	1	1												
Management Review Quarterly	1								1					
Medical Journal of the Islamic Republic of Iran	1								1					
Management	1	1												
Management and Organization Review	1					1								
Management of Environmental Quality	1	1												
Management Review Quarterly	1					1								
Management Services	1				1									
Marketing Letters	1							1						
MIT Management Review	1	1												
Motivation and Emotion	1									1				
Negotiation and Conflict Management Research	1		1											
Neuropsychiatric Disease and Treatment	1		1											
National Forum of Educational Administration and Supervision Journal	1			1										
Nations and Nationalism	1							1						
NWSA Journal	1						1							
Occupational and Environmental Medicine	1		1											
Oekom CR Review	1											1		
Organizational Behavior and Human Performance	1			1										
Organizational Behavior and Human Decision Processes	1			1										
Organizational Research Methods	1					1								
Organization	1						1							
Organizational Psychology Review	1				1									
Organization Studies	1							1						
Organizational Dynamics	1					1								
Pakistan Journal of Commerce and Social Science	1					1								
Pacific Focus	1							1						
Policy Studies Journal	1	1												
Periodica Polytechnica, Social and Management Sciences	1		1											
Production Manufacturing Research	1				1									
Production Planning and Control	1				1									
Personality and Individual Differences	1									1				
Personality and Social Psychology Bulletin	1		1											

Article subject	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
Psychology and Developing Societies	1		1											
Psychological Inquiry	1												1	
Psychological Review	1					1								
Psychological Science	1		1											
Psychosomatic Medicine	1		1											
Public Administration and Development	1							1						
Journal of Exposure Science and Environmental Epidemiology	1						1							
Qualitative Enquiry	1													1
Qualitative Research	1													1
Quality Innovation Prosperity	1	1												
Regulation and Governance	1	1												
Relations Industrielles	1					1								
Research in Political Sociology	1	1												
Review of Business	1				1									
Review of Educational Research	1			1										
Review of Managerial Science	1			1										
SA Journal of Human Resource Management	1					1								
SA Journal of Industrial Psychology	1					1								
Science and Engineering Ethics	1	1												
Supply Chain Forum	1	1												
Simulation and Gaming	1				1									
Social and Personality Psychology Compass	1		1											
Social Justice	1	1												
Social Behavior and Personality	1					1								
Sociological Quarterly	1											1		
Social Psychiatry and Psychiatric Epidemiology	1													1
Social Sciences	1	1												
Studies in Comparative International Development	1	1												
Stanford Social Innovation Review	1		1											
Seton Hall Law Review	1	1												
Strategic Outsourcing	1	1												
Supply Chain Practice	1	1												
Technical Communication	1							1						
The Contemporary Pacific	1							1						
Third World Quarterly	1							1						
Theory and Psychology	1									1				
Thunderbird International Business Review	1	1												
Tijdschrift Voor Economische en Sociale Geografie	1	1												

Article subject	Total articles	SCM / CSR / Audits	Well-being / Health / H&S	People management	Lean	PsyCap	IR / Voice	Sociology	Training	Positive psychology	Organisational behaviour	Practical organisation	Psychology, general	Technology
Transnational Corporations	1	1												
Transportation Research	1	1												
Total Quality Management and Business Excellence	1				1									
UC Irvine Journal of International, Transnational and Company Law	1	1												
Universia Business Review	1	1												
Urban Studies	1							1						
Women's Health	1		1											
Work and Stress	1		1											
Workplace Health and Safety	1								1					
World Economy	1		1											

Other Sources	
Thesis, conference paper, etc.	39
News, press release, briefing, etc. (e.g. CNBC, KPMG)	25
Book (Sage, Wiley, University of Cambridge, MIT, etc.)	89

Appendix 2: Audit Scope of Benchmarking Regimes

Audit Scope					
SA8000	BSCI CoC	SMETA	RBA CoC	ICTI	Walmart
SAI	amfori	Sedex	RBA	IETP	SAI
Child labour (Young workers not specified)	No child labour Special protection for young workers	Child labour and young workers	Young workers (Child labour not specified)	Underage workers Young workers protections	Underage workers Juvenile workers Age Verification
Forced and compulsory labour	No bonded labour	Choose employment freely	Freely chosen employment	Forced and prison labour (4 modules)	Voluntary labour (4 modules)
Association and collective bargaining rights	The rights to freedom of association and collective bargaining	Free association	Freedom of association Communication Worker feedback, participation and grievance	Freedom of association Worker helpline Grievance mechanisms Employee representation	Freedom of association and collective bargaining
Discrimination	No discrimination	Discrimination	Non-discrimination/ Non-harassment	Discrimination	Hiring and employment practices
Punitive measures	Workers involvement and protection	Harsh or inhumane treatment is prohibited	Humane Treatment	Disciplinary Practices	Worker Treatment Worker Discipline
Working hours	Decent working hours	Work hours	Working hours	Working hours Breaks	Labour hours
Compensation	Fair remuneration	Salary and benefits	Wages and benefits	Wages and benefits	Compensation (7 modules)
No precarious employment	Regular employment Subcontracting and home work Right to work		Contracts Homework and cottage work	Employment contract Employment practices	
Health & Safety	Occupational Health & Safety Protection of the Environment	Health & Safety Environment (2 modules) Community benefits	Health & Safety (8 modules) Environment (8 modules)	Environmental, Health & Safety (12 modules)	Health & Safety (12 mods) Environment (12 modules)
Management system	Social management system	Business ethics	Management system (8 mods) Ethics (8 mods)	Business ethics	Compliance with laws Anti-corruption Financial integrity
				Dormitory and canteen	Dormitories and canteen (11 modules)

RBA: Responsible Business Alliance (formerly EICC); SAI: Social Accountability International; ICTI: International Council of Toy Industries.

Appendix 3: Brands' Industry Benchmarking Regime Activity

Benchmarking Regime		RBA	BETTER WORK	SEDEX	BSCI	SAI / SA800	ICTI CARE	WRAP	FLA
Retailers	Walmart	Yes*	Yes	Accepts Audits	Accepts Audits	Accepts Audits	Yes	Accepts Audits	No
	Marks & Spencer	No	No	Yes	Yes	Yes	No	No	No
Electronics	Apple	Yes	N/A	No	No	No	No	No	Formerly
	BestBuy	Yes	N/A	No	No	No	No	No	No
	Microsoft	Yes	N/A	No	No	No	No	No	No
	Intel	Yes	N/A	No	No	No	No	No	No
	HP	Yes	N/A	No	No	No	No	No	No
Apparel	H&M	N/A	Yes	No	No	Yes	N/A	No	Formerly
	Gap	N/A	Yes	No	No	Yes	N/A	No	No
	Nike	N/A	Yes	No	No	Yes	N/A	No	Yes
	Levi Strauss & Co	N/A	Yes	No	No	Yes	N/A	No	No
	Phillips Van Heusen	N/A	Yes	No	No	No	N/A	No	Yes
	American Apparel	N/A	Yes	Yes	No	No	N/A	Yes	No
Consumables	Whole Foods	No	N/A	Accepts Audits	Accepts Audits	Accepts Audits	No	No	No
	Coca-Cola	No	N/A	Yes	No	Yes	No	No	No
	Costco	No	No	No	No	No	Accepts Audits	No	No
Toys	Hasbro	Yes	No	No	No	No	Formerly	No	No
	Disney	No	Yes	Accepts Audits	Accepts Audits	Accepts Audits	Yes	Accepts Audits	Accepts Audits

EICC: Electronic Industry Citizenship Coalition; BSCI: Business and Social Compliance Initiative; SAI/SA800: Social Accountability International; ICTI CARE: International Council of Toy Industries; WRAP: Worldwide Responsible Accredited Production; FLA: Fair Labour Association.

Appendix 4: Examples where diaries indicate aggregate dimensions

Aggregate dimension	Second-order theme	Diary Examples
Motivation for long- and short-term goals	Goals beyond the factory	*Every day I'm very tired when I get home from work. When I chat with my children I relax a lot. I see the children getting older and wiser year by year. They are my greatest motivation. So I must try my best to give my children the best possible life. (27/8/2019)* *It's Saturday, time to relax. I can't say I like this job or don't like it. I just want to work to earn some money to start my own business. For men with dreams this work is only temporary. (11/5/2019)* *I have always dreamed of travelling to the ends of the earth to see the magnificence of the sea and the beautiful scenery, and to take amazing photos. I don't know if this will ever happen but I will keep working to make this a reality – come on! (7/5/2019)* *I think my goal now is to make money and save enough to buy a house. No matter whether or not I get married in the future, I will then have a nest of my own. (9/6/2019)*
	Separation from family, isolation	*Today is Father's Day. When I think of our father's kindness to us, I can only shed tears. He passed away more than five years ago. Now I'm here, I miss my children and my mother even more. I don't even know what they've been doing at home. (16/6/2019)* *I'm happy with my job; not that I love it, but it's a job and a living. I'm not enjoying life here, though. I'm not good at socialising with people and don't know how to deal with it when people gossip about me. (7/5/2019)* *Every festival I miss my parents. I left my hometown six months ago and I miss them very much. Mum and Dad are old but they still worry about me. Every time they call and ask me how I'm doing I lie that I'm doing well and my colleagues are very good to me, so they won't worry. But the reality is so cruel. (13/9/2019)*

Hard work without meeting targets is demotivating	Production delays	*In the last hour of the shift, the machine broke down and couldn't be repaired properly, right up until we finished work. A lot of goods were piled up. Tomorrow morning, I don't know whether it can be repaired or not. If not, it will be a miserable day. (6/5/2019)* *Tonight we only did two hours of overtime because of a materials shortage. I only do one simple step, and the order is for 1000 units, so I'd planned to do them all by 9pm. I had to leave earlier and didn't fulfill my plan. I'll need to work harder tomorrow. (28/5/2019)* *I'm upset today. I've been cleaning up someone else's mess all day, fixing rework pieces, finishing semi-finished products, etc. Of course I can do this, but it really slows my efficiency which makes it harder to hit my daily performance target. (4/8/2019)* *Work wasn't smooth today. One of my colleagues is on leave, so two people are replacing him, but they can't handle it. I kept having to wait for goods. The usual person had been doing it for a week and got very fast but these replacements are slowing me down a lot. (8/5/2019)* *I'm in a bad mood because I wasn't good at making the new style. My process was inefficient and the previous process wasn't being done properly, so I couldn't meet my target today. (16/5/2019)*
	Rework	*I'm stunned. The supervisor forgot to tell me something and it's caused me lots of rework. (30/6/2019)* *Some of the process times set are really unreasonable. No matter how hard you try, you can't reach the target. Don't they want us to produce quality? It just becomes about how quickly you can make a bag. I'd say this accounts for 20%-30% of all rework. (26/4/2019)* *Today we were supplied with a lot of scraps and told they were okay to sew. The materials team wanted to boost their performance scores so they were really casual in selecting the materials. But you only end up having to unpick and rework everything you make. It's annoying. (24/5/2019)*

Work relationships, self-worth, feeling part of something	Feeling devalued by supervisors	*It's bad luck to have such a leader in the workshop. He is not reasonable at all, but keeps shouting. It's annoying! (13/7/2019)* *Well, they blame me for doing it quickly and then for doing it slowly. Won't someone just tell me how to do it? (16/5/2019)* *What a headache! He assigns all the easy products to his mates, and the difficult ones to me. I'm working really hard, but I can't earn as much as his mates. (10/7/2019)* *It was cooler today. But my heart is also cold. Day after day I don't get to do any good work. I just get to watch the others all earning their performance pay. Today, I was just called here and there to work on bits and pieces, trim the thread or that sort of thing. I felt like Cinderella! (26/8/2019)*
	Feeling devalued by colleagues	*Today the style of bags we are working on has changed again. The colleague opposite me was angry, and kept complaining. The material was not cut well, the die cut lines were missing on the panels, the panels could only be sewn together after you spent time matching them up. I have had enough of all her complaints! (7/4/2019)* *In my team I have an unreasonable colleague. He was wrong but did not admit it, and he wouldn't look at what he'd done wrong. He's been shirking responsibility. I've now completely lost confidence in the team. (6/6/2019)* *Today, because the others were busy, I helped him. But while I was helping, he started playing on his phone! I told him to start working immediately or I wouldn't help him, and he lost his temper! (5/6/2019)*
	Feeling appreciated	*My second day in the sample room, I'm still learning. It's a shame the sewing maching is not good, but I'm happy because I've begun to make a whole bag independently. (16/4/2019)* *It's the day after the new year's meal. We're getting closer and closer to the day when I can go home. My colleagues are all full of energy. In the time before the new year's holiday, we can all make good money. (7/1/2020)* *Today I feel upset. I argued with one of my best friends at work. We're all rushing on orders but we had to do rework, clearing up threads. The workstation teams were each pointing the finger at the other. I feel happier when sharing my feelings with you, thank you diary team! (6/8/2019)* *We were to put two buckles on each strap, for a big order. At first everyone took one bag at a time. Later some people got greedy, taking a box or two at a time. There were arguments and the supervisor got involved. She helped us with her patience. Working together, sometimes there will be arguments. But there is more fun. (6/15/2019)*

Appendix 5: Training for production line workers

Factory A work skills training protocol

Cycle 1 Weeks 1-3: 15 minutes per day over three weeks	Training Content			Training Level
	Sewing machine operation	Part Sewn	Correcting products that failed QA testing	
Day 1	Flat bed	Label	Sample 1	1*
Day 2	Raised bed	Front pocket	Sample 2	1*
Day 3	Cylinder bed	Inside pocket	Sample 3	1*
Day 4	Feed of the arm bed	Zipper	Sample 4	1*
Day 5	Post bed	Magic sticker	Sample 5	1*
Day 6	Side bed	Strap	Sample 6	1*

* Training Level 1: Basic knowledge to allow new joiners to finish simple products

Cycle 2 Weeks 4-6: 15 minutes per day across three weeks	Training Content			Training Level
	Sewing machine operation	Sewing skills	Correcting products that failed QA testing	
Day 1	Flat bed	Seaming materials	Sample 7	2**
Day 2	Raised bed	Bar tack sewing	Sample 8	2**
Day 3	Cylinder bed	Stitch piping	Sample 9	2**
Day 4	Feed of the arm bed	Joint stitching of body panels	Sample 10	2**
Day 5	Post bed	Making pockets	Sample 11	2**
Day 6	Side bed	Eliminating seam puckering	Sample 12	2**

** Training Level 2: Advanced skills allowing senior workers and team leaders to complete complicated products

Factory B work skills training protocol

Cycle 1 Weeks 1-4: 15 minutes per day over four weeks	Training Content			Training Level
	Machine operation	Hanger-making process	Correcting products that failed QA testing	
Day 1	Automatic hanger hooking machine	Connecting hook	Sample 1	1*
Day 2	Injection moulding machine	Plastic hanger	Sample 2	1*
Day 3	Velvet flocking machine	Velvet hanger	Sample 3	1*
Day 4	Metal hanger shaping machine	Metal hanger	Sample 4	1*
Day 5	Wood cutting machine	Wooden hanger	Sample 5	1*
Day 6	Wooden hanger painting machine	Painting, packing and labelling	Sample 6	1*

Training Level 1: Basic knowledge allowing new joiners to make several types of hangers

Cycle 2 Weeks 4-6: 15 minutes per day over four weeks	Training Content			Training Level
	Machine operation	Hanger-making process	Correcting products that failed QA testing	
Day 1	Automatic hanger hooking machine	Connecting hook	Sample 1	2**
Day 2	Injection moulding machine	Plastic hanger	Sample 2	2**
Day 3	Velvet flocking machine	Velvet hanger	Sample 3	2**
Day 4	Metal hanger shaping machine	Metal hanger	Sample 4	2**
Day 5	Wood cutting machine	Wooden hanger	Sample 5	2**
Day 6	Wooden hanger painting machine	Painting, packing and labelling	Sample 6	2**

*Training Level 2: Advanced skills allowing senior workers and team leaders to complete complicated products

Appendix 6: Training for line leaders

Supervision training protocol

Time	Content
1:15 pm - 1:40 pm	**Introduction of the training and lecturer** • Icebreaker • Introductions • Setting the scene for the day, purpose and expectations for the training.
1:40 pm - 2:10 pm	**Benefits of using supportive communication and implementation of this type of communication** Make it a habit to provide regular, informal feedback to workers instead of waiting until something has gone wrong. When giving feedback, make sure your comments are specific and actionable and at all times ensure they are work-related and never personal. Simply telling a worker that they did a good job isn't enough—tell them the work and tasks where they excelled, and where they fell short, to help them to learn. Communication should be encouraging and even when a task is challenging keep reassuring the group as well as individuals that it is achievable. Do not raise your voice and try to make a point of giving everyone some attention and encouragement each day. In addition to giving feedback to your team members, you should be open to hearing opinions about your own performance and any feedback or input that they might have about the tasks or production-line management. It's important to listen to their ideas with an open mind about how things could be improved on their production lines. With those insights, action plans can be implemented for improvement. Give workers feedback on any changes that are made. Consistently providing and receiving feedback could help workers to feel valued and motivated, and team members can also help each other to learn.
2:10 pm - 4:10 pm	**Setting goals and helping workers to achieve the goals** How to set clear goals and deliverables daily and how to communicate those to the team. Insights into the importance of establishing goals both with the hope of providing workers with clarity and focus on the work that needs to be done and to boost their motivation. It is necessary that goals are achievable and objectives well-defined and linked to a set of deliverables—small, achievable and actionable tasks—so that workers are clear on how their individual contributions are tied to larger daily outcomes. Once goals and deliverables have been set, it is crucial to monitor progress and ensure the day's work is on track, and to recap to the workers at every opportunity.
4:10 pm - 4:30 pm	*Break*

4:30 pm - 5:30 pm	**Coaching and developing workers – being supportive and encouraging** A number of examples and some role play demonstrating how to tell workers clearly about the team's daily, weekly and monthly goals and the steps required to reach them. How to provide frequent encouragement and real-time recognition through small supportive comments calling out good work. Thanking the team at the start and end of every day to show them you care. How to avoiding showing favouritism or appearing to have favourites.
5:30 pm - 6:00 pm	**Role play** to practice what was covered in the day's training. Talking through examples of situations and giving advice on the types of behaviour they could display in specific situations to help workers feel encouraged and supported.
6:00 pm - 6:30 pm	**Q&A** The lecturer and factory owner address trainees' questions and concerns.

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