

# The Role of Factory Facilities on Safety Risk Management in the Working Conditions in Sewing Co-operatives

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## ABSTRACT

Industrial factory facilities for small manufacturing enterprises such as sewing cooperatives are of scarcity in South Africa. In this study 83 sewing cooperatives in Gauteng province participated and these cooperatives rely on space consuming processes to deliver their output. All these cooperatives are contracted to supply school learners' uniforms to the Gauteng Department of Social Development. An identified problem is that these cooperatives work from facilities which present risks and hazards to their workers on daily basis and they also do not have basic first aid kits and some facilities have unsatisfactory exit points. Inspection, close monitoring and risk management advisory for manufacturing cooperatives should be among the key focus areas for labour inspectors in South Africa and also for funders need to consider safety risk management issues as part of their criteria.

*Keywords* – Working conditions, risk, factory facilities

## I. INTRODUCTION

Cooperatives are types of enterprises found in all of the continents of the world and the importance of research about their operations cannot be underestimated. The United Nations General Secretary 70<sup>th</sup> Report [1] on cooperatives defines cooperatives as autonomous associations of persons united voluntarily to meet their common economic social and cultural needs and aspirations through a jointly owned and democratically controlled enterprises. Cooperatives create employment for about 250 million individuals in the world directly and indirectly [2]. In Kenya 63% of the population derive their income and living from cooperatives [4]. Cooperatives are forms of businesses which are based in communities and which are guided by the specific objectives and collective goals of the members. Cooperatives produce goods and services like all other different forms of enterprises [4]. There are three types of cooperatives, which could be a primary, secondary or a tertiary cooperative. A primary cooperative is formed by a minimum of five members who should be natural person, a secondary cooperative the aim is to provide sectoral services and the tertiary cooperative advocates and engages members of state and private sector on behalf of its members [5]. The involvement of women in cooperatives is much greater compared to the involvement of men [25]. Cooperatives have similar challenges as many other enterprises which include lack of infrastructure and financial resources [26]. In South Africa 22% of 1247 textiles cooperatives are still in business and 78% have ceased to exist owing to the challenges encountered by manufacturing cooperatives [27]. However these cooperatives depend on various means to deliver their output, some operate from the homes of key members, others in redundant properties

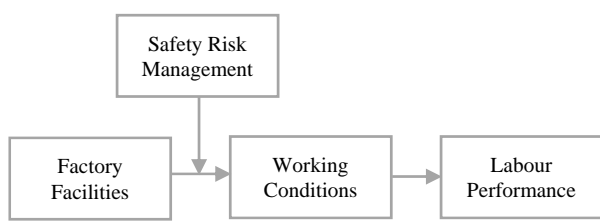
and those cooperatives which afford rent they operate from designated industrial properties [28]. Production facilities infrastructure for cooperatives' business operations in the less developed countries remains a concern and this has led to a lack of interest among researchers to do work on cooperatives particularly on their operations' processes [1]. There is limited information on how do cooperatives ensure that risk related to their operations is prevented and mitigated [6]. Also bigger cooperatives such as SUMA [7] have the means to exercise and implement safe working conditions as opposed to smaller cooperatives. When working in confined spaces which most cooperatives find themselves working in safety measures should be in place and has to be evaluated by a person competent to pronounce its safety [8]. Furthermore a cooperative as an employer of its members should provide and maintain as far as is reasonably practicable, a working environment that is safe and is without risk to the health of employees [9]. All enterprises have the duty to ensure safety of humans involved in their work. Although work has been done by ILO (International Labour Organisation) to ensure improvement and compliance of factories around the world to better working conditions and safer environment, in some small enterprises the health of and safety of workers is still compromised and in some factories in India, Vietnam, Bangladesh and Cambodia this is still an unresolved problem [29]. This paper seeks to present the need for consideration of risk management on working conditions particularly in sewing cooperatives. The research problem can be stated as the lack of adequate factory facilities leading to poor working conditions in sewing cooperatives. The objective of this study as already indicated is to propose a model of managing risks relating to working conditions in sewing cooperatives based on a study of 83 sewing cooperatives in the Gauteng province of South Africa.

The remainder of this paper consists of a literature review which represents a conceptual framework of this study, a research method is presented, findings and the implications of this study on engineering management are included in the recommendations, future research proposal and suggestions are added in the conclusion.

## II. LITERATURE REVIEW

One of the approaches used to select production or store facility location is the Analytical Hierarchy Process which is comparable to MOCMDM (Multiple Objective Criteria Decision Making), these require the assessment of the physical condition of the facilities when a decision regarding the production facility location is to be made [10]. Facility related risks can be identified in advance and in this paper, risk management is defined as preventing accident happening [11]. Working conditions in production sewing cooperatives require proper risk management to enhance

operational efficiency and create a safe working environment [12]. The management of risk can be done more effectively when the production processes are well defined and proper risk assessment has been done [13]. There are methods to assess risk, a more accessible method is the Failure Mode and Effects Analysis (FMEA). According to archeologists the history of sewing started 25 000 years ago during the last ice age [14]. Over the years, the demand for fashionable clothing, corporate wear and other garments inspired mass sewing operations which happened to be labour intensive. The global supply chains rely on labour efficiency, cost effective and outsourced production of garments which has also raised an interest from organized labour movements to be involved, which argue that besides the use of code of conducts in mitigation of risky factory working conditions there has to be engagement of workers about their working conditions [15]. Most workers in the garment sector tend to be females, mostly working from home based operations which are less formal and prevent organized labour associations from being involved [16]. The revitalization of textile industries by UK, African countries and others, after its significant decline has to place upfront the betterment of working conditions [17] to ensure that they do not make similar mistakes such as those of the Cambodian garment industry [17]. Safe and decent working conditions are important for the sustainability of operational performance and production efficiency in the global economy [18]. Hazardous working conditions, poor wages, excessive working hours and even child labour signals unsafe working conditions [8]. The most production intensive small garment and textile factories are either contracted or subcontracted to projects of bigger corporations which do not see themselves as having the responsibility to oversee and assess the working conditions of the factories contracted or subcontracted to them [19]. In a case of workers migrating from rural areas to city environments, they also find themselves vulnerable to working under poor factory conditions due to desperation for employment and as a result of their lacking understanding of labour rights [20]. Cooperatives are autonomous associations established by workers or a community of people, set up to generate income, but also to address socio-economic problems, it may be challenging to ensure decent and risk-free working conditions through external regulations where government also has limited budgets to employ a substantial amount of inspectors and safety officers.



**Figure 1 Theoretical Framework**

The above proposed conceptual framework seeks to suggest an alternative way of managing risks associated with working conditions in factories. Although cooperatives' members have a mutual understanding, they still need to account for safety risk management in their working conditions, to avoid employee or worker mortality [21]. The suggested model is supported by literature from various fields which include operations management, industrial design and psychology. Factory facilities play an important role in ensuring safe working conditions, they also create an environment under which safety precautions can be implemented and exercised which then can improve the working conditions [40]. Labour performance is associated with the feeling of being safe and protected from any work related dangers

or risks especially in production facilities where work is repetitive [41]. Safety risk management in a production co-operative is essential given that co-operatives are enterprises which should aim to improve livelihoods of those who work in them and protect their workers or members from any form of exploitation [42]. Safety risk management in repetitive sewing work requires that a co-operative's management takes into consideration the (1) condition of sewing factory facilities (2) basic first aid (3) ergonomics issues of machine operators (4) workers' safety awareness and (5) precautionary risk management in all working conditions [41][42]. There are also work pressures which are common in Privately Owned Factories which lead to compromise in managing safety related risks, in case of target driven sewing factories employees are less concerned about the working conditions and risk management systems, but more concerned about the amount of items they are able to make and the money they would be paid per [43]. Co-operatives in manufacturing, such as in sewing should treasure their human capital for better performance by ensuring that the factory facilities allow for safety risk management execution in order to create better working conditions and increase performance of machine operators and the workers involved in other processes of a sewing co-operative [44]. The following hypotheses are supported by the above literature descriptions of the suggested model and in future studies an empirical study could be done to test the model suggested on this paper.

**H<sub>1</sub>** Factory facilities determine the kind of Safety Risk Management practices of a manufacturer

**H<sub>2</sub>** Factory facilities' Safety Risk Management improves working conditions.

**H<sub>3</sub>** Improved safe working conditions lead to productive labour performance.

**H<sub>4</sub>** Manufacturing co-operatives' labour performance depends on the working conditions.

The above hypotheses also identifies the uniqueness of co-operative manufacturers which also promote the idea of ethical manufacturing, taking care of the weak and ensuring socio-economic development and the co-operative movement has also taught private enterprises lessons on taking care of their human capital before profits and consumer co-operatives in the United States of America and in developed countries have stood up against buying products made through child and forced labour [45]. The following section is the research methodology section which presents the procedure followed to extract data relevant to this research.

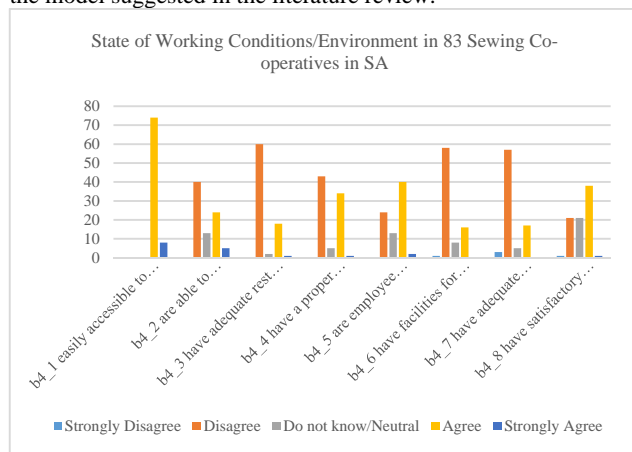
### III. METHODOLOGY

The results were extracted from a research data based on a census of 83 funded sewing cooperatives, which addressed a problem relating to facilities. Part of the set of constructs was on employment, addressing facility working conditions. This paper refers to the working conditions part of the data. The facilities ownership and property type on the questionnaire provide clarity about the nature of the infrastructure that the sewing cooperatives have access to. The sample was determined from the records of a government department which contracted 83 of the co-operatives to provide the department with school uniforms for learners or scholars in need. Measures such as self-administration of questionnaires and verification of data collected were implemented to ensure the completeness of the questionnaires [46]. This research study obtained an ethical clearance from the contractor of the sewing co-operatives which is a government department and for a similar study to be conducted elsewhere it

may be important to obtain permission or a clearance to collect data and engage the population concerned. The records of the respondents as provided by the contractor were validated and the contact information provided to ensure that the correct respondents are reached. The data covers for regions of the Gauteng Province in South Africa. Gauteng province is South Africa's economic hub and is more industrialized compared to other provinces, which made it more relevant to make use of this data. The questionnaires were self-administered and analysis done through SPSS 22 [32]. The section that follows presents the relevant findings.

### III. RESULTS

The findings has some key information which is shared here, of the 83 sewing cooperatives 3 of them operate from properties owned by their cooperatives. However, a large number of other cooperatives lease business property and 34 of the cooperatives rely on Home Based Business Operations. These cooperatives are based in townships and risk management is also influenced by internal factors and external factors. Facilities have an impact on risk management as those cooperatives working from Home Based Operations and other facility types. Section 4 of the research instrument gathered employment conditions information which encompasses risk management issues [22] and the section helps in attempting to answer the research question posed here. Out of the 83 cooperatives, 74 have easily accessible facilities and 34 have proper canteens as well as 18 have adequate rest facilities. On risk issues, it was found that 57 of the cooperatives did not have adequate basic medical facilities such as first aid kits and this posed as serious risk, possibilities of fire were not also understood by the cooperatives and less than half of the cooperatives had adequate exit point in their facilities, these findings are unpacked here with an aid of a graph. The labour law of South Africa is known to be rigid and protecting employees from any unfair treatment, pay and also any form of exploitation. The Occupational Health and Safety Act of South Africa also prescribes that safety uniforms and features are compulsory especially in manufacturing oriented activities (OHSA) and this is applicable to all size enterprises. These results here focus on Employment Conditions which the members of the sewing cooperatives work under, these include (1) accessibility of the factory facilities, (2) availability of adequate rest facilities, (3) adequate medical facilities (4) satisfactory emergency exit points (5) have facilities which support physically challenged persons and (6) ability of facilities to accommodate additional workers without major infrastructural changes. The following graph shows the findings of the study and substantiate the relevance of the model suggested in the literature review.



The above graph presents the current state of working conditions in the total of 83 sewing co-operatives. The findings gather that over 70 of the co-operatives are easily accessible to employees and to the public, which means also to emergency services in cases of fire or other emergencies. This also shows that the municipal town planning has played a role in creating accessibility. However, the facilities in which the co-operatives are working from are unable to accommodate additional workforce in times of need or when there a big sewing projects, meaning that they unsafely accommodate additional workers in the interest of delivering on their orders and about 60 co-operatives do not have adequate rest facilities only 18 co-operatives have access to such, this immediately pose a health threat to the workers of a co-operative in terms of ergonomics and musculoskeletal health problems associated with not taking adequate rests (Habib, 2015). The adequate rest facilities are also associated with having access to a canteen space which is a space perfect for having a meal and eating from a factory floor also increases chances of eating food contaminated by fabric dust or particles, from this study it is also evident that there aren't many of the sewing co-operatives with proper canteen facilities as 43 co-operatives disagree having a canteen or kitchen facility. Another item inquired about the employee-friendliness of the facilities, this refers to the facilities support of a healthy lifestyle in form of resources and furniture available and this may reflect that employees are now used to the challenging working conditions and 40 co-operatives agree that their facilities are employee friendly, besides the fact that 60 of them stated that they did not have adequate rest facilities. Although the co-operatives movement has a responsibility to lookout for the weak in society such as the disabled, the sewing co-operatives in this study did not make any provision to accommodate the disabled members or workers, only 16 co-operatives do have adequate facilities to host a physically challenged person and those facilities also extend to others who are not disabled as they feature safety measures and creation of more exit points, benefiting the co-operative indirectly. The major concern is that co-operatives referred to on this research do not have basic adequate medical facilities such as the first aid, this a total of 57 co-operatives and employing at minimum 10 people. Ensuring adequate access to first aid health is essential in sewing activities and to maintain a space which promotes safety. Finally, the last question referred to safety in terms of the availability of satisfactory emergency exit points, a total of 38 co-operatives agreed that they had adequate exit points for cases of emergency, but an equal number of 20 co-operative disagreed and also the other 20 was neutral on whether they had adequate exit points in case of emergency. The section that follows discusses this findings in line with the model proposed in the literature review.

### IV. DISCUSSION

The size of the sample is relatively small to make a general statement. However, the lack of adequate industrial facilities with safety features necessary for any-size manufacturing enterprise is of importance to operations engineering practitioners and the sellers of sewing machineries [23]. Due to high reliance of sewing operations on human intervention, adherence to labour standards is, non-negotiable. It is recommended that engineering safety practices be enforced through labour inspection. In conclusion, we recognize that sewing cooperatives around the world have impact positively on the livelihoods of many societies and particularly on women by helping them to earn income to provide for their families [24]. Even if so, if the safety risk in relation to working conditions is not well managed or mitigated

procedurally, it may cause loss of lives [30]. Industrial wear should be provided and be worn and other safety precautions should be adhered to without compromise, on daily basis [31]. Future research may work with a larger sample size and investigate the impact of safety manuals on worker owned manufacturing cooperatives.

## V. CONCLUSION

Industrial hygiene is a non-negotiable pre-requisite towards ensuring safe working conditions [31]. Refraining from non-compliance with labour legislation [33] and illegal power connections may prevent loss and accidents happening [34]. Engineering management, is arguably not a special kind of management, but a form of management directed to operations management and engineered solutions, therefore managers rely on people to get work done and it is equally important to ensure that there are safe working conditions regardless of the size of business [35]. Updated and recent engineering manuals on safety in small clothing manufacturing firms may come handy in this decade of great emergence of manufacturing cooperatives and may also be useful to building worker confidence of demanding safe and hazard-free working conditions [36]. Large corporations embrace safe working conditions given the benefits of an accident-free work place. Fire can break-out and if the facilities do not have clear exits staff members can burn or get hurt and during a natural disaster such as flooding workers need to know the evacuation procedure from the production facility. Moreover, a production facility should be physically strong to withstand any major natural disasters such as hurricanes [37] and finally, working in cooperatives should not compromise safety, health and protection of the cooperatives' members and workers. Manufacturing cooperatives should rather be attractive enterprises to work for given the social and economic benefits associated with cooperatives [38]. Safety engineers and town planners can play an important role in supporting the aims of developing facilities for small manufacturing cooperatives such as the sewing cooperatives [39].

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