Operational Performance Improvement through Continuous Improvement Initiatives in Micro Enterprises of Turkey

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Operational Performance Improvement through Continuous Improvement Initiatives in Micro Enterprises of Turkey

Purpose - Micro Enterprises have a vital role in the development of a nation by creating employment, encouraging entrepreneurship, balancing social income, and educating the workforce. Yet, Micro Enterprises face significant operational challenges such as low productivity, high production costs, and long changeover times. These challenges are often overlooked by researchers and practitioners but have a drastic impact on Micro Enterprises’ operational performance. With over 95% of the economy consisting of Micro Enterprises it is vital to improve operational performance and competitiveness of the Micro Enterprises.

Design/methodology/approach – Considering the data availability and practical challenges of gathering data from Micro Enterprises, an action research methodology was selected as a suitable research method. Following the initial diagnostic visits, planned interventions were prepared and results were observed to gather data and draw conclusions.

Findings - Findings suggest that to commonly adapted performance improvement initiatives by Large Enterprises cannot be directly applied in Micro Enterprises to enhance operational performance. Micro Enterprises lack the critical resources and company culture to easily adapt these initiatives. On the other hand, when these performance improvement initiatives are filtered according to specific needs of Micro Enterprises, continuous improvement initiatives were often found to be effective in improving operational performance. Specifically, 5S, SMED, suggestion schemes, layout improvements, management coaching, visual management, empowerment were found to be useful and suitable to address command and control culture, low productivity, unorganized workspace, undelegated authority, low skilled employees, and unwillingness to take responsibility problems.

Originality/value - This research extends and contributes to the current literature on continuous improvement initiatives, by revealing how performance improvement initiatives need to be filtered according to the specific needs of Micro Enterprises, and how these initiatives can be used to address specific problems to improve operational efficiency. It provides a conceptual framework to guide the decision-making process on operational performance improvement in Micro Enterprises.

Research limitation/implications - Further research is required to investigate the specific factors that affect the adaptation of continuous improvement initiatives such as culture and industry type.
1 INTRODUCTION

Increased competition in manufacturing environment is forcing companies to reduce cost and increase quality of their products and processes (Horvath and Szabo, 2019; Liu and Atuahene-Gima, 2018). Both academics and practitioners work to gain competitive advantage and achieve sustainable business performance. Several continuous improvement initiatives (CII) are developed and evolved overtime such as Total Quality Management (TQM), Lean Production, Six Sigma, Lean Six Sigma, and Total Preventive Maintenance. There is a significant amount of published work in management literature about how these CII are developed and can be implemented as well as their potential benefits on operational excellence (Yadav et al., 2020; Ghobadian et al., 2020; Chow and Moseley, 2017; Netland, 2016; Bhuiyan and Baghel, 2005; Detert et al, 2000; Casaret et al., 2000; Bessant and Francis, 1999).

In the modern manufacturing technology, the operations performance improvement efforts have shifted towards using advanced statistics and data to continuously reduce variance and waste (Toledo et al., 2018; Ejie, 2005; Snee, 1990). The literature suggests that various measures are considered as a part of the organisational performance such as corporate performance, financial performance, stock price performance (Khanchanapong et al., 2014; Chavez et al., 2013). Operational performance and quality performance are characterised in terms of competitive operational strategy (Chavez et al., 2013; Brah et al., 2002; Narasimhan and Das, 2001). Operational performance consists of criteria that highly depends on data such as productivity, customer satisfaction, cost, lead time, customer complaints and scrap, rework and defects that critically demand the data-based improvement initiatives (Gambi et al., 2015).

Despite the compelling activity in this field, the focus has mostly been on Large Enterprises with many researchers successfully implementing CII and achieving operational excellence (Lizarelli et al., 2019; Deshpande, 2018; Panwar et al., 2018). While the number of researchers
focusing on Small and Medium Enterprises has been increasing over the past two decades (Mani et al., 2020; Soares et al., 2017) there is still not enough concrete academic evidence to support the suitability and usefulness of CII in Micro Enterprises. Micro Enterprises are an essential part of the national and international economy. Despite the varying definitions, Micro Enterprises usually have less than 10 employees. In Turkey, Micro Enterprises are 92% of total businesses, create 36% of the total employment and 12% of total income (TUIK, 2019). Turkish Statistical Institute (2019) provides insightful data on technology selection at Turkish Manufacturing Industry as Micro Enterprises are divided into four different technology group as High Technology Manufacturing is 0.46%, Medium-High Technology Manufacturing is 9.54%, Medium-Low Technology Manufacturing is 32.39%, and Low Technology Manufacturing is 57.61%. Micro enterprises prefer low technology not only because of low investment costs but also it provides high flexibility. Low technology equipment at manufacturing can cause low productivity and obsolete production techniques. Thus, operational performance of Micro Enterprises is low. Despite being such a vital part of the economy, Micro Enterprises face serious operational challenges which reduces their performance and competitiveness. This research investigates suitability and usefulness of CII in the context of Micro Enterprises. Micro Enterprises have very limited resources and capabilities compared to SMEs and Large Enterprises which disables them from easily utilising CII to improve operational performance. It is essential to maximize the competitiveness of Micro Enterprises to increase their contribution to the local and national economy. By checking the adaptability of these tools this research expects to support operational performance improvement in Micro Enterprises.

2 LITERATURE REVIEW

2.1 Micro Enterprises
Micro Enterprises have a vital role in the development of a nation by providing employment, encouraging entrepreneurship, creating balancing social income, and supporting vocational training (Gebreeyesus, 2007). That the overall share of Micro-enterprises is around %85-95 within the OECD countries is an example of the significance of Micro Enterprises for the global economy (OECD, 2018). In the European Union, Micro Enterprises are considered as the smallest type of companies in this category. According to literature, SMEs are generally independent, multi-tasking, and cash limited (Perrini et al., 2007). Their operations are based on personal relationships and informality and they are often personally managed by the owners (McElwee, 2006; Vyakarnam et al., 1997). Products from Micro Enterprises are highly personalized, mostly sold and marketed locally in their area of operation and they are largely dependent on internal sources to finance growth (Ates et al., 2013; Hudson-Smith and Smith, 2007).

While Micro Enterprises are categorised in the same cluster as SMEs, characteristics, available resources, and capabilities of Micro Enterprises differentiate them from Small and Medium Enterprises significantly (Ramesh and Ravi, 2017). Voss et al. (1998) stated that the owner of a Micro Enterprise can be a manager who makes strategic decisions as well as a forklift driver who loads the delivery trucks. Operations management and operational excellence topics are still developing for SMEs, and there is a growing need for research in Micro Enterprises (Prasad and Tata, 2009). According to Prasad and Tata (2009) Micro Enterprises are not at the similar level as SMEs. While SMEs can have hundreds of employees, Micro Enterprises might employ only a handful of family members. Revenue, payrolls, total assets of enterprises, number of employees are often used as key indicators for classification and classifying companies based on the number of employees is the most common approach. Even so, there is a varying definition of company size according to different countries and regions as it can be seen from Table – 1.
Table – 1 Definition for SMEs by countries.

<table>
<thead>
<tr>
<th></th>
<th>Medium</th>
<th>Small</th>
<th>Micro</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>500</td>
<td>100</td>
<td>N/A</td>
</tr>
<tr>
<td>China</td>
<td>2000</td>
<td>300</td>
<td>N/A</td>
</tr>
<tr>
<td>EU</td>
<td>250</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>Australia</td>
<td>200</td>
<td>20</td>
<td>5</td>
</tr>
<tr>
<td>Turkey</td>
<td>250</td>
<td>50</td>
<td>10</td>
</tr>
<tr>
<td>UK</td>
<td>249</td>
<td>49</td>
<td>9</td>
</tr>
</tbody>
</table>

Inan and Bititci (2015) summarise the current literature and identify differences between Micro Enterprises, Large and SMEs as in Table – 2. Micro Enterprises face challenges such as low productivity, lack of financial assets, old manufacturing technologies and low-skilled employees (Räisänen and Tuovinen, 2020; Achtenhagen, 2017; Razak et al., 2018; Wolcott et al., 2008; Deichmann et al., 2004). Academic literature suggests that continuous improvement initiatives can be implemented with low capital investment and by adapting basic principles of problem solving (Bessant and Francis, 1999; Bhuiyan and Baghel, 2005). Some of the limiting factors for implementing CII in Micro Enterprises were described in the current literature (Klute-Wenig and Refflinghaus, 2020; Inan and Bititci, 2015; Prasad and Tata, 2009). Klute-Wenig and Refflinghaus (2020) stated that Micro Enterprises have different processes which are rather informal, unspecific, and have limited human capital. Researchers revealed that business activities of Micro Enterprises in the Urban West Africa region are primarily driven by basic needs. They also identified lack of access to capital, poor training, and general aversion to risk as developmental barriers for Micro Enterprises (Roy and Wheeler, 2006). Prasad and Tata (2009) emphasized the lack of research on Micro Enterprises and argued that Micro Enterprises use quality control measures rather than other initiatives such as Six Sigma and TQM. Inan and Bititci (2015) suggested that operational improvement theories can be implemented in Micro Enterprises with some adjustments. Isoherranen and Ratnayake (2018) emphasized the lack of measurement for operational excellence in Micro Enterprises and
developed an operational excellence maturity measurement tool for Micro Enterprises based on 20 case studies.

Despite being a crucial part of the economy and facing significant operational challenges, suitability and usefulness of CIIs to improve operational performance in Micro Enterprises is yet to be investigated. The existing literature on SMEs neglects firms less than 20 employees (Sraun and Singh, 2017; Bekas et al., 2011; Singh and Singh, 2010) and those studies fail to represent Micro Enterprises.
Table – 2 Differences between Micro, Small and Medium, and Large Enterprises

<table>
<thead>
<tr>
<th></th>
<th>Large</th>
<th>Small and Medium</th>
<th>Micro</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Leadership</strong></td>
<td>Leaders are more involved with strategic activities</td>
<td>Leaders are more involved with operational activities than strategic activities</td>
<td>Leaders are exclusively involved with operational activities</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>Participative management</td>
<td>Mixture of empowered supervision and command and control</td>
<td>Command and control</td>
</tr>
<tr>
<td><strong>Strategic Planning</strong></td>
<td>Short and long term planning</td>
<td>Short term planning focus on niche strategies</td>
<td>Fire-fighting for survival</td>
</tr>
<tr>
<td><strong>Organisational Structure</strong></td>
<td>Hierarchical with several layers of management</td>
<td>Flat with few layers of management</td>
<td>All employees connected to manager/owner</td>
</tr>
<tr>
<td><strong>System and Procedures</strong></td>
<td>Formal control system</td>
<td>Personal control</td>
<td>No procedures</td>
</tr>
<tr>
<td></td>
<td>High degree of standardisation</td>
<td>Some degree of standardisation and formalisation</td>
<td>Low degree of standardisation and formalisation</td>
</tr>
<tr>
<td><strong>Human Resources</strong></td>
<td>Training and staff development is planned in large scale</td>
<td>Training and staff development is adhoc and small scale</td>
<td>Almost no training and staff development activities</td>
</tr>
<tr>
<td><strong>Market and Customer Focus</strong></td>
<td>Formal customer relationship</td>
<td>Formal-Informal customer relationship</td>
<td>Informal customer relationship</td>
</tr>
<tr>
<td></td>
<td>Larger customer base</td>
<td>Limited customer base</td>
<td>Very limited customer base</td>
</tr>
<tr>
<td><strong>Operational Improvement</strong></td>
<td>Vast knowledge or understanding of operational improvement activities</td>
<td>Limited knowledge or understanding of operational improvement activities</td>
<td>No knowledge of understanding of operational improvement activities</td>
</tr>
<tr>
<td><strong>Innovation</strong></td>
<td>Innovation based on R&amp;D</td>
<td>Innovation based on clusters and networking</td>
<td>Innovation based on technological improvement and customer needs</td>
</tr>
<tr>
<td><strong>Networking</strong></td>
<td>Extensive external networking</td>
<td>Limited external networking</td>
<td>Very limited external networking</td>
</tr>
<tr>
<td></td>
<td>Better understanding of support available from local government</td>
<td>Limited knowledge of funding and support available from local government</td>
<td>No knowledge of funding and support opportunities</td>
</tr>
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</table>

2.2 Continuous Improvement Initiatives

Deming described CII as a set of improvement initiatives that increase successes and reduce failures in organisations (Juergensen, 2000). McAdam et al. (2000) derived a definition for continuous improvement from the academic literature and defined it as “an evolutionary incremental process which leads to a better way to compete and that adds value to existing
processes and encompasses the entire workforce of the organisation”. CI is also defined as the utilisation of initiatives that increase success and reduce failures (Juergensen, 2000). Alternatively, Bessant et al. (1994) defined CI as “a company-wide process of focused and continuous incremental innovation”. Fryer et al. (2007) suggested that CI can only occur when all the members of an organization work together to improve processes and reduce failure to enhance overall business performance. Bessant and Francis (1999) suggested that continuous improvement is a learning process. The development mechanism of continuous improvement capability includes (Bessant and Francis, 1999): training in basic problem finding and solving process, training in basic CI tools and techniques, setting up relevant vehicles (e.g., quality circles) to enact CI, development of an idea management system to receive and respond to ideas, developing an appropriate reward and recognition system.

Continuous improvement initiatives refer to the programme, techniques and tools that are implemented in the industry to steer companies towards operational excellence, sustainability and competitive advantage. In the recent years, the most well-known initiatives that preached continuous improvement (CI) and contributed towards operational excellence are Six Sigma, Lean, Total Quality Management (TQM) (Sreedharan et al., 2017). The role of CII towards business excellence has been proven in the past literature across different industries such as manufacturing, healthcare, governance, transportation, and logistics (Sreedharan and Raju, 2016).

Figure – 1 House of continuous improvement
Many studies revealed that the nature, effectiveness and the implementation capability may vary with demographic characteristics such as location of the business, culture and size of the organisation (Sreedharan and Raju, 2016; Tjahjono et al., 2010). Benson et al. (1991) and Ahire and Golhar (1996) suggested that company size does not affect an organisation’s capability to implement the CII. Ahire and Golhar (1996) found that the small firms can use their strengths to reap the benefits of the CII as effective as large firms. The explanation of the underlying philosophies is discussed in the next sections to provide an outline of each of the initiative, its performance indicators and impact on company size for successful implementation.

2.2.1 Total Quality Management

TQM originates from Japanese manufacturing environment. Naslund (2008) emphasises that a few of the primary thoughts were brought forward by Deming (1986) and Juran (1989). It is an integrated management philosophy that has a strong emphasis on CI through meeting customer requirements, reducing rework, long-range thinking, increasing employee involvement and teamwork, process redesign, competitive benchmarking, team-based problem-solving, constant measurement of results, and closer relationships with suppliers (Ross, 2017). According to Samson and Terziovski (1999), TQM affects the operational performance through customer satisfaction, employee morale, productivity, defect as a percentage of production volume, cost of quality and delivery in full on time. Terziovski and Samson (2000) identified that company size may impede the successful effects of TQM implementation (Powell, 1995; Fisher, 1993). TQM implementation in SMEs was mostly driven by external consultants with the expectation of immediate result and still preoccupied with the concept of Acceptable Quality Level (AQL), which is inconsistent with the philosophies of “Quality is Free” and “Zero Defects” (Crosby, 1979).
2.2.2 Lean Production

Lean was developed by Taichii Ohno, former executive Vice President of Toyota’s production system (Ohno, 1988), which later was identified as Lean manufacturing (Womack et al., 1990). The term lean thinking/management has evolved to a broader philosophy which is now often used interchangeably with operational excellence. Aqlan and Al-Fandi (2018) focused on the prioritisation of CIIs in manufacturing companies and developed guidelines for the initial steps of lean implementation. Womack and Jones (2003) stated that lean activities reduce waste and create value and wealth in the company. Lean manufacturing strategy focuses on commonly found non-value adding waste streams in companies, which usually includes the waste in human effort, inventory and time (Todd, 2000). Hines et al., (2004) explained lean in two levels; a strategic level, which drives the thinking and mind-sets and an operational level that focuses on achieving improvements on the shop floor.

The literature shows the common performance indicators used to measure the impact of lean towards operational performance are flexibility, cost, quality and delivery (Imai, 2014; Chavez et al., 2013). As the implementation of lean is adapted on the shopfloor, several indicators emerge such as overtime, the launch of new products, inventory turnover, lead time and setup time (Santos Bento and Tontini, 2018). Research in lean manufacturing is predominantly targets large companies due to more extensive implementation in such organisations (Karim et al, 2011). Moreover, lean production was found to be more effective at high volume production systems (Khanchanapong et al., 2014). However, small sized companies can implement lean as they have greater flexibility (Brown and Inman 1993), smaller number of people to be managed (Leyer and Moormann, 2014; Pendharkar and Rodger, 2007), less infrastructure requirement, funding, knowledge, expertise and cost (Achanga et al. 2006; Boughton and Arokiam, 2000).
2.2.3 Six Sigma

Six Sigma is an organized and systematic method (Design-Measure-Analyse-Improve-Control) for process improvement and new product and service development that relies on the statistical and scientific methods to reduce defect rate through reducing the process and product variation (Alexander et al., 2019; Linderman et al. 2003). Six Sigma is viewed as an integrated approach for supporting the continuous improvement at strategic and operational levels to continuously improve customer satisfaction and profits (Alexander et al., 2019; Snee, 2004). Six Sigma aims to improve the organisational performance through cost savings, job quality, customer satisfaction and increasing product and process quality (Sin et al., 2015; Shafer and Moeller, 2012; Tjahjono et al., 2010; Antony et al., 2005). Six Sigma gained momentum over the past years as advertised by the high profile companies such as GE (savings of $8 billion), Bank of America (savings of $2 billion), Honeywell (doubled savings on service projects) and Motorola (savings of $20 billion) (Arndt, 2002; Bossidy and Bonsignore, 1999). However, although Six Sigma has a significant impact on the industry, the academic community still lags in the understanding of it and lack of theory as the basis for research in Six Sigma (Antony, 2004; Linderman et al., 2003). Most of the success stories and case studies depicting from the large companies, while the Micro Enterprises, Small and Medium companies were barely addressed in the current literature. Small Enterprises faced notable barriers of the CII adoption, which are resources such as financial and knowledge constraint, lack of skills, lack of standardisation and formalisation, unwilling to invest time for the implementation, short-term decisions and planning (Alexander et al., 2019; Turner et al., 2005; Antony, 2005).

The literature shows that large companies are more likely to adapt improvement initiatives as a routine with the expectation of continuous improvement of customer satisfaction as depicted and the summarised in Figure–2. Adebanjo et al. (2014) stated in their study that, out of 21 improvement initiatives, Large Enterprises were aware of more than 10 of them compared to
small companies. The literature shows that CII implementation offers a significant advantage for the large companies, while the potential or similar benefits are vague to the Micro, Small and Medium companies. Fotopoulos and Psomas (2009) suggest that regardless of company size, all companies should invest their effort in adapting CII to survive in competitive markets. Although there is a high number of Micro Enterprises operating in the UK and EU, the current body of knowledge on the implementation of the CII are mainly addressing Large and SMEs (Ghobadian and Gallear, 1997). There is a dearth of research on Micro Enterprises, and further work in these organisations is in a critical need (Ghobadian and Gallear, 1997).

![Figure – 2 Tools and company size addressing the CII](image)

CIIs were developed and utilised in Large Enterprises such as Six Sigma originating from Motorola and Lean Production is also known as Toyota Production System. Despite the increasing number of research on SMEs over the last two decades, implementation of CII in Micro Enterprises is mostly overlooked by researchers due to challenges with data collection activities, data biases and bigger sample sizes (Prange and Pinho, 2017). Timans et al. (2016) developed a CI framework which is applicable to a wide range of size and type of industry. Bekas et al. (2011) emphasized that studies on companies with 40-180 employees cannot represent the case for Micro Enterprises. As Penrose (1959) states “the differences in the
administrative structure of the very small and the very large firms are so great that in many ways it is hard to see that two species are of the same genus... we cannot define a caterpillar and then use the same definition for a butterfly”. It is clear that Micro Enterprises are different than Small, Medium, and Large Enterprises. Literature suggests that firms can adapt continuous improvement initiatives and develop organisational capability regardless of their size (Ahire and Golhar, 1996; Benson at al., 1991). On the other hand, there is evidence which claims that continuous improvement initiatives cannot be easily adapted and implemented in Micro Enterprises (Klute-Wenig and Refflinghaus, 2020; Inan and Bititci, 2015; Prasad and Tata, 2009).

Some CII were previously studied in the context of SMEs (Timans et al., 2016; McAdam et al., 2000; Yusof and Aspinwall, 2000). Micro Enterprises differ from SMEs with their resources and capabilities and currently there is not enough academic evidence to support using CII to improve operational excellence in the context of Micro Enterprises. The lack of academic evidence on the suitability and usefulness of CII could limit Micro Enterprises' ability to seek operational excellence and merits further research. This research is essential to support Micro Enterprises ability to pursue operational excellence by studying implementation of CII in the context of Micro Enterprises to eliminate some of their operational challenges and enhance their contribution to the economy. CII are adjusted differently to both Large Enterprises and SMEs. Thus, implementation of CII without any changes in the case of Micro Enterprises cannot be expected and following research questions arise at this point.

RQ – 1 Can Continuous Improvement Initiatives be implemented by Micro Manufacturing Enterprises?

RQ – 2 How can Continuous Improvement Initiatives be adapted in Micro Manufacturing Enterprises?
A theoretical model is conceptualized based on the information gathered from the literature in Figure – 2. It is proposed that Micro Enterprises have different characteristics and challenges compared to SMEs and Large Enterprises, which limits their direct use of CII. Literature review has provided knowledge and tools which can be adapted and implemented by larger companies. However, Micro Enterprises cannot implement CII without filtering and adapting these initiatives. Hence, following inferences in Table – 3 were made based on the existing claims in the literature to filter CII initiatives which can be adapted by Micro Enterprises:

**Table – 3 CII Implementation in Micro Enterprises**

<table>
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<tr>
<th>Suggestions</th>
<th>References</th>
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<tbody>
<tr>
<td>High-cost CIIs cannot be implemented</td>
<td>(Prasad and Tata, 2009; Isoherranen and Ratnayake, 2018; Klute-Wenig and Refflinghaus, 2020)</td>
</tr>
<tr>
<td>CIIs requiring a strong educational background cannot</td>
<td>(Klute-Wenig and Refflinghaus, 2020; Hairuddin et al., 2012)</td>
</tr>
<tr>
<td>be implemented</td>
<td></td>
</tr>
<tr>
<td>Highly complex CIIs cannot be implemented</td>
<td>(Klute-Wenig and Refflinghaus, 2020; Isoherranen and Ratnayake, 2018; Hairuddin et al., 2012)</td>
</tr>
<tr>
<td>CIIs with short return-on-investment can be implemented</td>
<td>(Inan and Bititci, 2015; Baba-Deros et al., 2006; Garengo et al., 2005)</td>
</tr>
<tr>
<td>CIIs which can be simplified for less educated employees can be implemented</td>
<td>(Klute-Wenig and Refflinghaus, 2020; Inan and Bititci, 2015; Prasad and Tata, 2009)</td>
</tr>
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TQM and Six Sigma requires highly educated employees for implementation. It is hypothesized that CII which fit the inferences in Table – 3 can be implemented in Micro Manufacturing Enterprises as shown in the theoretical framework in Figure – 2. CII are linked to cultural change in an organization from top to bottom (McLean and Antony, 2017). Aim of CI is sustaining incremental improvements at current processes with low-cost interventions (Sanchez and Blanco, 2014). We define CI is as a culture of incremental improvement for processes and products in Micro manufacturing Enterprises and applicable tools of other performance initiatives are also considered as CI tools such as 5S, SMED and Visual management, Suggestion Schemes, Empowerment Techniques, and Management Coaching.
3 METHODOLOGY

Action research methodology was selected for this research. It enables researchers to take action and create knowledge or theory through that action (Coughlan and Coghlan, 2002). Action research enables researchers to understand how a phenomenon is happening rather than what is happening (Stringer, 2013). Reason and Bradbury provided the following working definition for action research (Reason and Bradbury, 2001, p. 1):

Figure - 1 Theoretical framework
"...a participatory, democratic process concerned with developing practical knowing in the pursuit of worthwhile human purposes, grounded in a participatory worldview. It seeks to bring action and reflection, theory and practice, in participation with others, in the pursuit of practical solutions to issues of pressing concern to people, and more generally the flourishing of individual persons and their communities."

Coghlan and Brannick (2001) stated that action research is appropriate when the research question is explaining actions over a period of time within the studied organisation and aiming to understand organisational change or improvement by studying an aspect of the system. Furthermore, it tries to capture and understand the process of change or improvement to create new knowledge from it. In simple terms, action research enables researchers to test undeveloped theories in a new context by creating change in organizations. In academic literature, there is currently not sufficient evidence to test operational CIIs in Micro manufacturing context and the nature of our research requires understanding how these initiatives can be developed in Micro Manufacturing Enterprises. As studies on Micro manufacturing environment are mostly descriptive and there are only few known facts, action research methodology fits with the research concept and question. Figure – 4 represents the followed procedure in this study.
3.1 Case Selection and Data Collection

Data was collected through interviews and observations over a year. Firms were selected based on the following criteria: willingness to grow and innovate, number of employees, motivation to collaborate, sectors and location. Trabzon where the companies were selected from, is a small city in Northern Black Sea region of Turkey. The main exporting products are Hazelnut and Hazelnut products, Fish and Fish Flour, Fresh Vegetables and Fruits, Machinery and equipment (DOKA, 2021). Trabzon is the most crowded and developed city in the northern Black Sea region of Turkey. Thus, the manufacturing industry is mainly developed to fulfil the needs of local and regional markets. The number of Small and Medium Sized Enterprises are limited, and Micro Enterprises are the backbone of the local economy. In this study, Micro Enterprises were defined based on their number of employees as “firms employing 1-20 employees”. As low technology driven manufacturing industry is dominant in the region, extra workforce is required to increase production capacity. Organizations were contacted with support from the Trabzon Chamber of Commerce. Initially 10 organisations were identified, 6 of which did not
want to participate in the project. The remaining 4 Micro manufacturing firms agreed to collaborate.

Firm A is a manufacturer of furniture and related products. It has been in the business for over 40 years. At the time of this research 7 employees were working at Firm A. Products are sold locally and regionally in the neighbouring cities. Firm B manufactures accessories for windows and doors. It has seven employees and has been in business for 15 years. Firm B also sells their products regionally. Firm C is a manufacturer of cardboard boxes and employs 20 people. It has been in business for over 20 years, and it offers products regionally. Firm D produces organic jam and marmalade products. It has been in business for 2 years and employs 2 people. It targets customers locally within Trabzon.

Data collection process is represented below in Figure – 5. First contact with companies were made through a phone call to introduce research topic and organize a face-to-face meeting. In the first meetings, a semi structured interview was conducted with owners/managers. The main objective of these meetings was to understand organizational structure, culture, current problems, and market positions. Observations were made on production processes in each firm. Then, an action plan was formulated to solve current issues through interventions. An introductory meeting was held with owners/managers to explain planned actions. Following months, companies were visited to observe changes in operations and production performance.
4 DATA ANALYSIS AND FINDINGS

In-depth and cross-case analyses were conducted through qualitatively listing and sorting data gathered from the site visits. This was followed by checking for potential links and patterns between the individual data points. Following interventions were designed based on filtering strategy of CII:

5S: This was suggested to improve workstation and shop floor efficiency and create a well organised working environment. 5S is an easy-to-implement, cost-effective method which has a successful track record within the academic literature.

SMED: SMED methodology is a proven method for reducing changeover time and cost. SMED has an easy to follow three step methodology which does not require high-cost investment or extensive training. Micro Enterprises often externalize the cost of these changeovers through increased product prices, which reduces their competitiveness. Therefore, SMED can be a useful tool for Micro Enterprises with high product variety, to reduce inventory, lead time and cost.

Suggestion Scheme: To encourage employees to generate ideas and share this with the management a suggestion scheme was designed. Employees have extensive practical know-
how and can often generate ideas which can solve short- and long-term problems on the shop floor. Suggestion schemes can capture this internal know-how and improve efficiency and workflows on the shop floor.

**Layout Improvement:** Micro Enterprises do not have an organized shop floor optimised for workflow efficiency. They purchase manufacturing equipment in time and place according to the available space on the shop floor. Implementing layout improvement is an effective way of optimising the workflow based on the production type and can reduce lead time and production cost.

**Management Coaching:** Managers of the Micro Enterprises are heavily involved in the operational side of the business and do not pay enough attention to the strategic management aspect. In this intervention, managers are encouraged to focus on the strategic management requirements of the business and transfer operational responsibilities to their employees.

**Visual Management:** Visual management is a supportive mechanism which helps to prevent mistakes on the shop floor. Visual signs placed around the shop floor act as a constant reminder for employees, such as determining the stocking areas and control lists and reminders to turn off the machine equipment. It is a very easy to implement and cost-effective improvement initiative.

**Empowerment:** In Micro Enterprises, responsibility is on the shoulders of the managers/owners. This intervention is designed to delegate authority to solve empowerment problem, encourage employees to participate, create slack time for owners/managers. New organisation structures are designed by defining roles and responsibilities. Roles and responsibilities enable employees to make daily non-critical decisions by themselves.

**Case A**
In Case A there is a prevalent command and control culture in which the owner sets out tasks which were followed by the employees. This structure prevents employees from taking any action by themselves which could provide benefits and performance improvements. Furthermore, employees and their know-how were significantly undervalued, and no responsibility was given which prevented employees from creating and sharing new ideas that would improve operational performance. The shop floor was unorganized and untidy. To give an example, moulds are scattered around the shop floor without any clear and systematic labelling. Company had very limited vision towards maintenance and problem solving. They only act when a problem occurs on the production equipment or process, and there is no planning or preventative action taken in advance.

To address these problems 5S, Suggestion Scheme, Management Coaching, Visual Management, and Empowerment interventions are designed and suggested for Firm A. While solving the actual problems in the firm, it is aimed to create continuous improvement capability within the firm. Production type can be defined as cell production in Firm A and each employee works in their own station. They each have their own order and share equipment with other employees during production. Production equipment were thrown around or stored without an order or organisation which led to significant time losses spent while looking for the right equipment. 5S philosophy could solve this problem and change employees’ behaviour in long term to protect the equipment. A workshop was delivered to deliver the 5S training and implementation of 5S in one of the working stations was demonstrated to employees. After the workshop, employees followed 5S philosophy and re-designed their working stations. Visual management was utilised to support 5S intervention and prevent rework in the shop floor. Also, a check list was created to prevent employees to leave any equipment behind at installation of furniture. Furthermore, management coaching intervention was designed to enable owner/manager to focus on strategic activities such as marketing, networking, and learning as
well as to share his authority to create more responsible employees. Management coaching was
delivered through weekly meetings with the managers. During these meetings detailed aspects
of business strategy and operations management were discussed. In addition, empowerment
intervention followed management coaching intervention to shift organisational structure and
define new positions for employees and give responsibility. During management coaching
meetings, an organisational structure change was suggested to the manager. These changes were
explained to the employees during weekly meetings. Suggestion scheme was designed to
increase involvement of employees to process and product improvement processes by sharing
their ideas. Idea generation cards were designed and placed at the production floor. Monthly
meetings were held to monitor idea generation process.
As a result of the interventions implemented in Case A, search time for equipment and spare
parts were significantly reduced as part of the 5S improvements. The following quote from an
employee supports that argument: “… I used to search parts and tools in drawers. These recent
changes took time to get used to, but now I have specific places for each tool, and I am now
wasting time to search for the parts, I know exactly where to look…” In addition, visual
management intervention reduced misplaced and lost equipment ratio by 70%. Shared
equipment was placed in designated areas, but the owner did not want to invest into placing
coloured signs on the shopfloor which could further improve that ratio. Employees argued that
suggestion schemes were extremely helpful in enabling them to share their ideas. They stated
that “We always had a family environment, but we were never asked to share our opinions
before, these cards helped us to a part of the process by enabling us to share our more ideas.
We now feel more valuable”. Management coaching and empowerment interventions changed
the organisational structure through division of tasks and shared responsibilities. Business
owner had more time to focus on strategic aspect of the business while employees felt more
valued through their increased responsibilities.
**Case B**

In the initial diagnosis, several operational problems were observed in Case B. Heavy reliance on low-skilled employees to conduct daily operations were creating serious challenges in sharing owner’s authority and responsibility with employees. There was no formal or informal process improvement initiative in place and overall productivity of the firm was very low. Furthermore, low productivity and high work in progress (WIP), and prolonged changeover time caused significant delays in lead time. Identified problems were addressed through 5S, SMED, Suggestion Scheme, Management Coaching, and Empowerment interventions.

5S was implemented to increase efficiency and safety on the shopfloor. Employees were given a 5S training in a one-day workshop and the implementation details were demonstrated in their workstations. In order to reduce changeover time SMED methodology was utilized through a workshop and in-line training of the high-skilled worker. Suggestion scheme was implemented to encourage employees to put their product and process improvement ideas forward. Idea sharing cards were placed in several locations on the shopfloor. Employees were informed on how to use them. Management coaching and empowerment meetings were designed to increase authority sharing and to encourage employees to take more responsibility. Management coaching was delivered through these weekly meetings with the owner, to increase the awareness on the continuous improvement activities and changing the company culture to support continuous improvement. Finally, empowerment was delivered through distribution of tasks and personal instructions to the employees.

In Case B, application of 5S increased the productivity on the shopfloor. Employees were happy to have a more organised workplace when nonessential and unused production equipment were taken outside the production area. By utilising SMED, 35% of the changeover time was reduced and further improvements which required small investments were planned with the management. Suggestion schemes enabled employees to share their ideas with the management.
team. In 3 months over 100 ideas were offered by the employees, however, most of these ideas were based purchasing new equipment rather than focusing on process improvement. Management coaching and empowerment interventions were only partially successful. In this case, employees did not want to take on more responsibilities as they have seen these responsibilities as additional workload. Firm owner stated that “… employees were not interested to do extra work to increase productivity or quality. Less responsibilities meant less workload for them…” Hence, these interventions did not yield the expected results.

**Case C**

Case C had several problems which were identified at the end of the initial diagnosis. There were serious issues of trust between the employees and the firm owner. In addition, the owner operated under a very strict command and control culture which disabled employee participation and contribution to improvement and innovation. The company had no formal or informal improvement initiatives in place, and they were extremely busy with day-to-day business activities. Furthermore, there was no control mechanism to track equipment efficiency or performance. Frequent changeovers were taking a significant portion of the operational time. To solve the identified problems, all the designed interventions were found useful and relevant. 5S workshop was delivered to employees who were working with many tools and parts. Implementation of 5S methodology was demonstrated at one of the workstations to teach employees. SMED workshop was made to show how to reduce changeover time. SMED improvements were supported by providing in-line support to the employees at the beginning of the intervention. Suggestion scheme was implemented through creating an idea sharing and generating environment at firm. Idea sharing cards were placed at commonly used areas and employees were informed about these cards and encouraged to use them. There were similar product routes on the shopfloor, but the production equipment was not located to optimize the workflow. A new layout improvement providing this optimisation was offered to the
management. Management coaching was focused on authority sharing and increasing collaboration, productivity in firm. Each conversation with the firm owner was used as an opportunity to change division of tasks, distribution of responsibility and creating a company culture supporting continuous improvement efforts. Visual signs on the shopfloor were necessary to increase productivity and product safety. Colour coding the inventory area, forklift lines, and working area were suggested. Empowerment intervention was suggested to increase employees’ responsibility and encourage idea sharing. On daily meetings, the owner was informed about sharing authority and creating trust within the firm.

Implementing 5S increased employee productivity by reducing searching time and tidying up the shopfloor. For instance, all moulds for printing process were randomly placed on shelves before the intervention. After implementing 5S, all moulds were organized based on the alphabetically according to the customer’s name. Before implementing SMED, each changeover would take approximately 60 minutes. By utilising SMED this was reduced to 25 minutes on average. Suggestion schemes were happily accepted by the employees. One of them stated that “I was never asked for my opinion about the work before.” There were many ideas offered by the employees, but the owner only considered ones with either no cost or low cost.

By utilising layout improvements, WIP locations were changed to reduce the health and safety risks on the shop floor and improve productivity. However, some of the equipment could not be optimally relocated due to constructional limitations of the building. The owner had bad experiences with employees in the past which disabled him from sharing any authority with employees. Visual management and empowerment interventions could not be implemented due to owner’s unwillingness to invest into these interventions.

**Case D**

In Case D, the main performance limiting factor was the disorganized workplace. Furthermore, there was a lack of control and management in a labour-intensive working environment. To
improve productivity, company needed better organisation and control over its processes. To solve organisation and control related issues in Case D, 5S, Layout Improvement, Management Coaching, and Visual Management interventions were offered. 5S was suggested to keep the kitchen area tidy and clean.

Implementation was conducted jointly with the owner and employees through a workshop. Equipment and materials were relocated based on usage frequency as a part of the layout improvement intervention. Layout improvements were based on production routines and the workflow. Management coaching was designed to introduce a continuous improvement philosophy to the company culture. Visual signs were suggested for the equipment. Stock control check lists and labels with necessary information were also used.

As a result of these interventions, kitchen was completely reorganized based on the 5S philosophy. The owner found the new layout very practical as she was able to find all the equipment and materials faster. Layout improvements also considered health and safety issues in the kitchen, while improving efficiency and productivity. The intervention created positive impact as owner tried to implement all suggested interventions Stock control system enabled firm to keep raw material fresh and reduced expired material cost.

Cross case analysis provided us with the similarities and differences between firms. Different types of interventions were suggested for each firm and some interventions were implemented and others were not possible. These interventions are summarized in Table – 3. 5S workshops were implemented in all firms as it does not require high cost to implement. Management had a strong role especially at firm C to create a sustainable change in organization. It was observed that the visual management and empowerment were not applied successfully in any of the visited firms. Visual management has a certain cost, and the owners did not want to spend money for signs or paints. Empowerment issues could not be solved in firm C because of owner’s attitude. A limited progress was observed in Firm B because of the educational level.
of employees. In Firm A, empowerment issue was solved as the owner understood how important it was to share his authority and there was someone in the firm ready to get more responsibilities.

Table-1 Suggested interventions and implementation status

<table>
<thead>
<tr>
<th>Interventions</th>
<th>Case A</th>
<th>Case B</th>
<th>Case C</th>
<th>Case D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Suggested</td>
<td>Implemented</td>
<td>Suggested</td>
<td>Implemented</td>
</tr>
<tr>
<td>5S Workshop/Training</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>SMED Workshop/Training</td>
<td>-</td>
<td>-</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Suggestion Scheme</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Layout Improvement</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Management Coaching</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Visual Management</td>
<td>✓</td>
<td>✗</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Empowerment</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

✓ Implemented  ☐ Partially Implemented  ✗ Not implemented

Results of interventions were analysed with a before and after analysis as shown in Table – 4. Implementation of suggested interventions contributed firms to increase productivity, employee participation and reduce failures and defects in production. For instance, Firm A has started to use a check list before delivering their furniture which prevented employees from forgetting necessary equipment and parts for the assembly. Furthermore, Firm B reduced its WIP levels by 30% by reducing their product changeover time. Firm C reduced their changeover time by 60% through implementation of SMED. Finally, firm D increased raw material security and reduced expired product costs by implementing visual management practices.
Table 2 Before and after analyses

<table>
<thead>
<tr>
<th>Firm</th>
<th>Before</th>
<th>After</th>
</tr>
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<tbody>
<tr>
<td>A</td>
<td>Firm A was mainly focusing on product quality and ignoring the cost reduction activities. Owner was controlling all employees and did not have enough time focus on the strategic management activities.</td>
<td>Especially empowerment and management coaching interventions encouraged owner to share his authority and enabled him to focus on more strategic activities. Employees with more responsibilities performed better at operations. Visual management applications reduced failures especially during the furniture installation processes.</td>
</tr>
<tr>
<td>B</td>
<td>Productivity in Company B was very low. They were holding high levels of semi-product inventory. There was no employee participation. Command and control culture was dominant.</td>
<td>Changeover time for the injection machines were improved significantly by implementing SMED workshop. Thus, semi product inventory levels were reduced by %30 in 6 months. Furthermore, employees participated in improvement activities through idea suggestion cards. Although management team was motivated to share their authority with employees, employees were not interested in getting more responsibilities.</td>
</tr>
<tr>
<td>C</td>
<td>There were productivity problems at production site. Few employees were able to share their ideas with owner/manager. Command and control culture was dominant.</td>
<td>Changeover time was reduced significantly with SMED workshop. Employee participation did not work very well in this case as the command and control culture could not be changed due to the owners/managers trust issues with the employees.</td>
</tr>
<tr>
<td>D</td>
<td>Layout problems were reducing the production efficiency. There was no stock control mechanism.</td>
<td>First in, First out (FIFO) rules are implemented at storage to keep the fruits fresh and it reduced waste products. Factory layout was improved by optimizing equipment locations in the kitchen. Visual tables and signals were used to lead employees for doing jobs right at first time.</td>
</tr>
</tbody>
</table>

On the other hand, some challenges were identified at implementation of intervention especially for empowerment and authority sharing in firm A, B, and C. In Firm A, the owner shared his authority with the most experienced employee who has been working with them for more than 20 years. He was meeting with that employee every morning to check their production schedule. They managed to reduce the number of these meetings and started meeting weekly to discuss the production schedules. In Firm B, low skilled employees were not willing to have more responsibility. Thus, even though the owner wanted to share his authority, it was not possible to do so. Finally, the owner of Firm C did not trust his employees and he had no intention of sharing his authority. He had a strong belief that he can only perform better if he kept an eye...
on his employees. These were identified barriers to improve empowerment in Micro Manufacturing Enterprises.

The purpose of this study was to provide a better understanding of the CIIs in Micro Enterprises. Our findings suggest that CIIs can be adapted by Micro Enterprises but not all of them. As TQM, Six Sigma, and Lean production initiatives require highly educated and skilled employees and Micro Enterprises often do not have resources to hire and/or train those employees. However, the findings of this study suggest that it is possible to develop CII in Micro Manufacturing Enterprises. Furthermore, findings also show that CI activities can be adjusted for Micro Enterprises. Activities that promote CI in Micro Enterprises were identified as below:

**Encouraging employees for participation.** It is commonly found that employees in Micro Enterprises are ignored for creativity and improvement activities. Owners/managers do not consider employees as a source for new ideas. Thus, managers of Micro Enterprises should change their attitude and encourage employees to share their ideas and knowledge. 5S, SMED, Suggestion Scheme, Management Coaching and Empowerment have positive impacts on employee participation by encouraging employees to share ideas, reminds owners that their employees are not only the workforce for physical activities but also a source of innovation and new ideas.

**Training all workers and managers to focus on production and cost reduction activities.** Adjusted training programs of 5S, SMED, Visual management, and Suggestion Schemes were designed and delivered. All training programs achieved their aims while no cost was required. Each organisation may have different needs for operational excellence and training programs should be designed based on needs. Data showed that 5S, SMED, Suggestion Scheme, and Management Coaching promote cost reduction and waste elimination activities in Micro Manufacturing Enterprises. 5S and SMED were adjusted to Micro Enterprises as employees
had poor educational background, these two trainings were conducted with an emphasis on practice rather than theory, so that the employees can observe and learn from real practices.

*Coaching owners/managers to share more authority with employees.* It is essential to eliminate empowerment problems in Micro Manufacturing Enterprises. Coaching and convincing managers to share authority, encouraging employees to participate and involve with improvement activities. Each case had a different challenge on empowerment and authority sharing. In a Micro Enterprise, whether Management Coaching can be effective or not depends on the firm owner’s attitude and approach.

*Building trust between employees and owners/managers.* Command and control culture creates insecurity in working environments, prevents employees from sharing ideas, which forces the owner/manager to deal with unnecessary activities. It is essential to create trust between employees and owner/manager to change organisational culture from command and control to a more inclusive and participative culture. Results have shown that all interventions had a positive impact on building trust.

Upon reviewing the literature, selection criteria for CII in Micro Enterprises were identified as low cost, average education, easy to implement, and short-term ROI. Based on these criteria several CII were proposed to improve operational performance in Micro Enterprises. These CII were adjusted and simplified to be implemented in Micro Enterprises. Our findings suggest that in most cases CII can be adapted in Micro Enterprises after adjustments. Furthermore, analysis of case study data has revealed shared problems that were targeted with CII as it can be seen from Figure – 6. Command and control culture, low productivity, unorganized workspace, undelegated authority, low skilled employees, and unwillingness to take responsibility problems are solved with suggested interventions. The theoretical model was updated with the findings from the case-study and improved to guide decision making process for CII implementation in Micro Enterprises as shown in Figure-6.
5 DISCUSSION

This research investigated the implementation of CII to drive operational excellence in Micro Enterprises and increase their contribution to local and national economy. Findings suggest that CII can be implemented in Micro Enterprises, however, they require further attention and adjustments to make them suitable for implementation, which is in line with the findings of the previous research (Sreedharan and Raju, 2016; Tjahjono et al., 2010; Ahire and Golhar, 1996; Benson et al., 1991). Furthermore, this research demonstrated that even when a filter is applied to the CII, there are certain challenges, such as reluctance to give or receive responsibility, that needs to be overcome in Micro Enterprises. Some of these challenges were also mentioned in the previous work (Hieu et al., 2021; Klute-Wenig and Refflinghaus, 2020; Inan and Bititci,
Common problems experienced by Micro Enterprises which were previously highlighted in the literature as low productivity, lack of financial assets, old manufacturing technologies, and low skilled employees (Räisänen and Tuovinen, 2020; Razak et al., 2018; Achtenhagen, 2017; Inan and Bititci, 2015) were also confirmed in this study. Successful utilisation of CII to overcome these problems was achieved through three key implementation methods, employee participation and training, authority sharing and empowerment, and building trust and participative organisational culture. An important element behind these implementation methods was the researcher’s own expertise and knowledge in the field. Micro Enterprises are keen to implement low cost and no-cost improvement initiatives, but they do not have access to theoretical and practical knowledge behind these initiatives. One of the key arguments of this paper is that Micro Enterprises need external support from academia, government, NGOs etc. to learn about and initiate such improvement activities (Räisänen and Tuovinen, 2020; Wolcott et al., 2008; Alstrup, 2000).

This study extends the existing literature by providing this information along with a decision-making tool through which CIIs can be adapted by Micro Enterprises. Understanding the characteristics of Micro Enterprises offers a filter which can help researchers to decide whether to a CII can be adapted by Micro Enterprises. Action research methodology has enabled to diagnose these problems in each case to design specific interventions and solve several operational problems while increasing continuous improvement capability in each firm (Räisänen and Tuovinen, 2020; Wolcott et al., 2008; Alstrup, 2000).

Development of CI capability in Micro Enterprises has also similarities with SMEs and Large Enterprises. CI requires organisational and cultural change also in Micro Enterprises as it does in others (Bhuiyan et al., 2006). Development process of CI initiatives in Micro Manufacturing Enterprises require similar drivers as literature suggest for Large Enterprises and SMEs (Bhuiyan and Baghel, 2005; Bessant and Francis, 1999).
This research extends and contributes to the current literature on CI implementation by identifying specific activities that promote CI in Micro Manufacturing Enterprises. Increasing employee participation promotes CI capability in any organisation (Jurburg et al., 2017; Garcia-Lorenzo et al., 2000) but this study found that the strategic path of increasing employee participation in Micro Enterprises is different than Large Enterprises and SMEs. Ahire et al. (1996)’s research was used as scale development for many other research for three decades. Our fieldwork only confirms some of these aspects as there are resource constraints in Micro Manufacturing Enterprises. For instance, providing individual finance opportunities to employees or creating quality circles to fix problems are not applicable in Micro Manufacturing Enterprises.

Employee participation can be promoted by creating a suggestion and idea generation system in Micro Enterprises, encouraging and motivating employees to share ideas to solve a problem or improve process or product. The adjustment here was to simplify high qualified staff required activities and eliminate and/or minimize cost required activities. Each firm performed differently in employee participation and further research in different contexts can identify new interventions that promote employee participation.

Educating and training employees is another source of promoting CI (Lam et al., 2014; Bessant and Francis, 1999). This research extends the literature by identifying source of training for Micro Manufacturing Enterprises. Ahire et al. (1996) stated five dimensions for employee training as availability of resources for training, frequency of training and retraining an employee, number of employee levels participating in the same training session, number of employees trained in based quality concepts, and satisfaction of employees with overall training. Training is not seen as a cost in Large Enterprises while Micro Enterprises managers mostly consider training as a cost burden. Trainings should not add any cost to their daily operations. For instance, they send their employees to get free training from suppliers when a
supplier introduces a new equipment or material. Furthermore, a key difference between Micro Enterprises, SMEs and Large Enterprises on training an employee is that, it is seen as a risk for Micro Enterprises. Owners believe that when an employee has more experience and knowledge, he/she can leave the organisation for a better opportunity or start their own business. Trainings on 5S, SMED, FIFO, Suggestion Scheme, and cost reduction trainings were delivered. After these trainings, employees used their learnings on the shopfloor. Literature is confirmed here as training employees would increase CI initiatives (Jurburg et al., 2017; Lleo et al., 2017; Alstrup, 2000; Bessant and Francis, 1999) but the source of training in Micro Manufacturing Enterprises is different than SMEs and Large Enterprises. Limited resources, lack of educated employees and mindset of owners can be claimed as the main reasons that prevent learning and training activities in Micro Enterprises. Thus, an external source is required to initiate CII implementation in Micro Enterprises. Countries have different support mechanism to promote economic development and growth. However, these support mechanisms were not in the scope of this research. Further studies can develop strategies to create external sources to promote training and learning activities in Micro Enterprises.

Empowerment and trust also promote CI in Micro Enterprises (Jurburg et al., 2017; Kaye and Anderson, 1999). The need for empowerment is recognised by management team of Large Enterprises and SMEs to create more flexible and innovative work environment (Hill and Huq, 2004) but the owners of Micro Enterprises tend to claim control of all process and people within the organisation and do not like to share their authority and power. On the other hand, we successfully changed organisation structure of one of the firms in this study and results were very successful for the company. It can be argued that Micro Enterprises cannot solve their empowerment issues by themselves, and they need external sources to lead them on this problem.
There are various constraints that hinder Micro Enterprises ability to apply CIIs such as lack of education, unskilled workforce, and financial difficulties. Matt and Rauch (2013) suggest that Micro Enterprises do not initiate CI activities on their own and our findings support this claim. Policymakers, universities, and funding organisations should not only create financial support but also increase training opportunities to initiate CII implementation and support operational excellence in Micro Enterprises.

6 CONCLUSION

This study brings novelty to the academic literature by investigating the implementation of operational CIIs in Micro Manufacturing Enterprises. The findings of this study suggested that Micro Enterprises have significant constraints such as financial, educational, productivity and empowerment. Those problems can be solved with CII, leading to operational performance improvement in Micro Enterprises. It can be stated that a CI culture can be created in Micro Enterprises with specific adjustments in current knowledge. In the absence of these adjustments Micro Enterprises cannot utilize CII. Owners of Micro Enterprises appreciate short term benefits as they are not willing to plan for long term.

It was demonstrated that CI practices which required low cost and were not complex can be implemented more successfully in Micro companies. This study argues that the CII and other CII cannot implemented in Micro Enterprises without filtering and adjusting according to their specific needs. The conceptual model presented in this study can guide the CII implementation process in Micro Enterprises and improve operational performance.

Micro Manufacturing Enterprises face financial constraints which prevents them from investing in operational excellence and productivity activities. Governments provide funds which can be dedicated for these activities and required trainings. In Micro Enterprises the owners would need an initiation from an external source which still would not work without owner’s full
commitment. In addition, local trade organisations, governmental or non-governmental organisations can use this information to create training programmes for Micro Enterprises.

There are limitations to the findings of this research as well as some future research opportunities. This study was conducted in Northern Black Sea region of Turkey and the findings demonstrate organizational behaviours of the companies within this region. Therefore, it is important to replicate this study in different parts of the world, and to observe how organisational behaviours and cultural influences differentiate. Moreover, the conceptual model which was tested in this research suggests that CII can be adapted by Micro Enterprises after adjustments. This does not mean that Lean, TQM or Six Sigma initiatives cannot be used in Micro Enterprises but instead it means that they may also need certain adjustments and filters, to be implemented in Micro Enterprises.
REFERENCES


DOKA. [http://doka.org.tr](http://doka.org.tr)


http://mc.manuscriptcentral.com/apjba


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http://mc.manuscriptcentral.com/apjba


TUIK Stats. [http://tuk.gov.tr](http://tuk.gov.tr)


Thank you for your valuable comments and contributions to our research.

<table>
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<tr>
<th>No</th>
<th>Reviewer's Comments</th>
<th>Researchers' Responses</th>
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<tr>
<td>1</td>
<td>In the earlier sections of the paper, the author(s) have explained in greater detail the importance of SMEs in Turkey. This is a welcome addition to the paper. However, the &quot;why&quot; of the paper is still not clear. That is to say, why is it important to conduct a study on CIIs in the context of microenterprises. After explaining this gap and a thorough proofread and copyedit.</td>
<td>Dear Reviewer, thank you for this valuable comment, In our manuscript, Page 3 lines 40-52; this part explains the importance of CIIs in micro enterprises very briefly as it is in the introduction section. Page 5 lines 18-60 and page 6 lines 3-13; outlines the current literature on micro enterprises, their characters, challenges that they face, their operational excellence situation and lack of CIIs research in this context. Page 12 lines 43-60 and page 13 line 8-40; explain the gap in the literature and formulate the research questions based on this gap. We added a new sentence to emphasize the why is it important to conduct this research in the context of micro enterprises at page 13 Lines 35-43. We also proofread the manuscript to the best of our ability.</td>
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