

**NOT SO COMMON IMPROVEMENTS: THE USE OF OPERATIONAL
IMPROVEMENT METHODS IN THE AMERICAS**



By

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ABSTRACT

This preliminary exploration helps to strengthen the case for increased promotion of improvement methodologies, such as Lean and Six-sigma, in operations of small and medium sized enterprises (SMEs). Businesses are often cited in literature as using these improvement methods but participants failed to demonstrate a high level of implementation or familiarity with such methods. Thirty-seven participants were purposefully selected for their precise knowledge to answer the multi-method questionnaire. In spite of significant established use, these improvement methods are sometimes considered fads and suffered from partial or failed implementation. The main challenges noted by participants were skills, labour, and management knowledge. Our analysis also found low accountability, when coupled with the challenges described suggested issues regarding leadership competency.

The key findings were the behavioural difference between small and large business managers, including a very low rate of improvement method adoption which was restricted to large business.

The importance of this research was the re-focussing of operational improvement methods for SMEs, because national productivity levels will likely reach crisis levels in the coming decades. Productivity levels of SMEs may be the key to the next big breakthrough in national or global productivity gains, yet this sector is chronically underserved or functionally ignored.

Keywords:

SMEs, operations management, lean, six-sigma, productivity, management accountability, improvement methods

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This research considered the use of improvement methods such as Lean, Six-sigma, and others improvement methods to be common because of their availability and extensive publication in scholarly works and internet posts. However, we were concerned that businesses were not demonstrating functional use of common improvement methods in spite of their potential benefits. The knowledge available to business and how it is acquired was evident in how industry professionals talk about these methods, using language such as, "many businesses" or "most companies", which might suggest the proliferation of improvement methods. These assertions of common use from professionals and scholars often regarded large enterprise and seemed to have a glazing-over effect of the more fundamental problem of general productivity. Ultimately, the cumulative use of improvement methods such as Lean or Six-sigma could have an impact on national productivity levels, yet implementation seemed scarce.

There is a growing concern about how to maintain economic growth on a macro scale; this issue will be very problematic in the coming decades. Work done by researchers at the McKinsey & Company consulting firm exemplifies this growing problem, "Without action, global economic growth will almost halve in the next 50 years" (Manyika, et al., 2015a). The study suggested that, "about three-quarters of the potential productivity growth comes from the broader adoption of existing best practices, or catch-up improvements" (Manyika, et al., 2015a). Another publication in the Harvard Business Review explained:

The world is aging, and that matters for growth. In the past, an abundant and growing labor pool was a powerful engine of the world economy; today, the number of workers is starting to decline in many countries. This leaves no alternative but for companies, individuals, and governments to work in smarter ways. In an era of profound

demographic change, another productivity revolution is a necessity. (Manyika, Remes, & Dobbs, 2015b)

Existing process improvement methods are geared towards solving productivity issues in business. Some of the solutions are: cost reduction, waste elimination, standardization, simplification/complexity, human capital, maintenance of work, process and service alignment. These solutions offer particular value for small and medium enterprises (SME) where leveraging existing capital is less of an option. Some critical outcomes of these efforts are: cash flow, increased capacity, reduced lead times, faster return on investment, increased quality, increased skills, and increased supply-chain visibility. This makes a case for the expanded use of existing improvement methods and may be the *productivity revolution* that is right under our noses.

As industry professionals, we were involved in the activities, associations, and education of different methods of competitive advantage. We took the position that "most" organizations of any size would be considering, or implementing, common improvement methods such as Lean, Six-Sigma, or others, as a normal way to achieve higher productivity.

In this paper, while not making a treatise on these improvement methods, we will reference Lean and Six-Sigma to establish our understanding of the research. However, we acknowledge that there are many other methods available such as, Theory of Constraints (TOC), ISO, total quality management (TQM), regional or association standards, balanced scorecard, and newer fads or methods such as, big data and demand driven materials requirement planning (DDMRP).

Literature Review

Fad or function?

Spector (2006) noted how fashionable improvement methods are saying, “Lean and Six Sigma are two of the most effective business-improvement techniques available today” (as cited by Na`slund, 2008, p. 269). Na`slund went on to describe the seven step life-cycle of a fashionable method remarking that “new procedures may be adopted when they are widely hailed as solutions to human and organizational problems” (p. 270). Understanding a fashionable method was an important starting point when considering that over two-thirds of change implementations fail to provide expected benefits, creating the feeling that these methods are merely fads. Na`slund argued that Six-Sigma and Lean are just "repackaged versions of the former [Just-in-time and Total Quality Management]" (p. 269) and addressed the need for management buy-in and "good communication and information" (p. 269). Na`slund also noted that the missing element in these methods was an "approach to organizational change and improvement" (p. 269).

New era of competitiveness

In spite of Na`slund's (2008) findings, the methods, repackaged or not, have been somewhat effective. Since the Japanese advanced us from Fredrick W. Taylor's (1911) *The Principle of Scientific Management* into a future of no compromises or trade-offs, the gloves came off. The Japanese had managed to compete on all fronts achieving “lower costs, higher quality, faster product introductions, and greater flexibility, all at the same time” (Hayes & Pisano, 1994, pp. 80-82), ushering in a new era of competitiveness. Hayes and Pisano started off discussing trade-offs in terms of what strategies were adopted, such as "focussed factory" (p. 79), and then compared the operational acumen of the improvement methods to "long runs of

products" (p. 80) that were the industrial standard since Henry Ford's mass production. Hayes and Pisano make an interesting point about strategic fit and improvement methods, noting that the improvement method can be costly if it does not align with the strategic direction of the organization (p. 83). This tends to confirm Na'slund's (2008) assertion around the lack of organizational change approaches. It also becomes very important when considering the kind of constraints to competitiveness organizations face.

The need for productivity

The Canadian Chamber of Commerce published an article titled *Tackling the top 10 Barriers to Competitiveness* (CCC, 2013). Of the 10 items noted, at least four are easily addressed by the use of common improvement methodologies, these items are: skill shortages; inadequate workforce productivity; poor innovation performance; and lack of access to capital. While improvement methodologies will not fix strategy or unwanted products, they do present a great first step in making a business more productive and competitive. "Maintaining a competitive edge demands innovation. Successful businesses recognize that innovation and productivity are intrinsically tied" (CCC, 2013. p. 14).

The Global Competitive Index for 2012-2013 rated Canada 14th out of 144 countries for doing business. It noted the top three most problematic factors for businesses in Canada: inefficient government bureaucracy; insufficient capacity to innovate; and access to financing (World Economic Forum, 2012, pp. 130-131). Though a company may not be able to change the government, technologies like Lean and Six Sigma have shown that they can increase production capacities by reducing throughput times, allowing more time and interest for innovation, and improve cash flow which allows for better access to financing and business growth.

The issue of cash flow was addressed when Padachi (2006) discussed the importance of working capital on small and medium enterprise performance saying,

The flow of funds is very necessary to maintain business. If it becomes weak, the business can hardly prosper and survive. The cash flow problems of many small businesses are exacerbated by poor financial management and in particular the lack of planning cash requirements (p. 47).

The Canadian Chamber of Commerce (CCC, 2013) noted these problems are often more apparent in SMEs, as they lack the skills, knowledge, and resources to implement change.

Hawkins (2001) noted that “alongside larger companies, SMEs have a vital role to play in the effective operation of these supply chains, as satisfying the demands of any market rarely depends upon a single organisation” (p. 1). Hawkins continued to discuss how the links between these companies created the overall strength of the industry and how SMEs are critical to larger business performance, explaining improvement methods with a focus on Lean manufacturing (Hawkins, 2001). This takes us back to the beginning and Fredrick Taylor's concern for National productivity when he quoted President Roosevelt in his introduction, who said, "The conservation of our national resources is only preliminary to the larger question of national efficiency" (as cited in Taylor, 1911).

The idea of national productivity in combination with the lackluster competitiveness of SMEs is concerning in spite of the impressive potential. Ironically, Statistics Canada found that SMEs were more profitable than larger organizations. “Profitability gradually increased with the size of firms until it reached a maximum among those with 5 to fewer than 20 employees After the maximum was reached for this group of firms, profitability consistently fell as size increased” (Statistics Canada, 2012). It was also noted that SMEs employ 64% of the Canadian workforce, and in 2010 small business alone produced over 25% of all exports (Government of Canada, 2012b). SMEs created the seed stock for innovation; large corporation growth and

emergence are the essence of a stable economy. With the clear importance of SMEs, there needed to be more effort to stimulate this sector to improve productivity on a national scale.

Method

This research was conducted as a part of a personal learning sabbatical, consisting of a 26 month motorcycle journey through 16 countries in the Americas. It is important to mention this early because it was the vehicle for our self-funded research and influenced, positively and negatively, our ability to design and conduct the research. We took a pragmatic approach of “responding to a real need” (Wicks, Reason, & Bradbury, 2008, p. 19) in our inquiry, hoping to find if improvement methods are commonly used. This gave us the opportunity to reflect on the potential impact of these methods and inform our further action (p. 19). For that reason, we have suggested that this effort was a first person inquiry to inform our own epistemology with a third person approach (Reason & Bradbury (Eds.), 2008, p. 6) to effect what we think our society sees as its current business paradigm. We intended a post-research inquiry into why business leaders engage, or not, with improvement methods. This would help us to interpret if there were some conditions or circumstances that impacted the ability or choice of a participant to implement these methods for competitive advantage.

Additionally, we considered the interpretation of the results as "ways of knowing" (Glesne, 2011, p. 5), assuming that the variables would be complex with non-generalizable outputs. We sought to understand what was happening through the investigation of improvement methods being used, to seek patterns, hypotheses, and themes. We used multiple-methods of inquiry such as a structured, semi-structure, open-ended questionnaire instrument, and observation to get a sense of the organizations understanding of the improvement methods, for triangulation, and validation.

Research Design and Data Collection

The opportunity for conducting our research was ambiguous because of our travel schedule and ability to contact businesses. This would influence the design and methods used. Certainly, with such a broad scope and geographical area we reached out to any business participants that fit our criteria using convenience and purposeful sampling techniques. Marshall (1996) called purposeful sampling a “judgement sample” (p. 523), focusing on “subjects who have specific experiences (critical case sample)” (p. 523), such as senior managers and owners. It was unreasonable to even attempt a quantitative study under our conditions, so we engaged in a qualitative exploration to “provide illumination and understanding of complex psychosocial” (Marshall, 1996, p. 522) interpretations and characterizations. We thought this might be more interesting than a generalization (p. 524) so we considered the qualitative diversity of the participants not their quantitative distribution in our questionnaire (Jansen, 2010).

Sampling procedure

Very often, interest in our research was secondary for participants as they were keen to hear about our travels once the survey and tour were completed. This was a benefit for us as it established an amiable researcher-participant relationship immediately. We were also aware of time constraints for managers and owners of businesses as well as the need for anonymity and financial sensitivities when designing the data collection. For this reason, we limited our questionnaire to 30 minutes with a 30 minute observation tour of the facility. Additionally, we verbally agreed with each participant to obscure any identifying information and did not ask any financial questions. All information was hand written and later transferred into data software for analysis and interpretation, with written copies being destroyed. Raw data was stored on a

password protected file and participants were coded as: North American-"NA"; Central American and Caribbean-"CA"; South American-"SA".

There were a total of 17 questions (see APPENDIX A) in the survey with seven structured question, three semi-structure questions, and seven open-ended questions filled in by the researcher. We would ask the question then paraphrase to get a clear understanding of the answer. The structured questions concerned demographics, such as, location or number of employees. The semi-structured questions looked at facility type (i.e. Manufacturing or service), competitive factors (i.e. Price or quality), and competitive strategy (i.e. Lean or others). Open-ended questions covered work processes, the need for improvements, knowledge of improvement methods, current problems, and a recent success. After the survey, we would tour the facility and ask for an explanation of their process. When they indicated the use of a particular method we would ask to see an example.

We also tried to get a sense of the resources available to the organization through employee numbers, physical facility size, and complexity as indicated by number of stock keeping units (SKUs). Resources also included the management knowledge of techniques and problem identification. Articulation and identification of problems would help us characterize the level of knowledge available within the management participant. Finally, we would make our observations on what evidence of improvement methods we could perceive during the tour.

Participant selection

Participants were chosen purposefully as critical case and by convenience. The criteria for participant selection was that they had the authority and position (senior management or owner), within a department or company, to speak to the processes and programs in place and to conduct a tour. We approach over 100 potential participants but had a high rate of nonresponses

and a few unsuitable subjects. In total, we conducted our study on 44 businesses through 16 countries from July 2010 to April 2012. However, we lost seven files due to data corruption in Copacabana, Bolivia-leaving a final analysis of 37 companies throughout the Americas.

Findings & Conclusions

We started our analysis by separating the data into parts for comparison. In the first part we compared the lack of methods identified with the subjective size (resources) of each organization. The second part looked at management knowledge by their ability to identify opportunities or constraints. Finally, we considered our observation of the facility to rate the level of improvement method implementation.

Business resources

We determined resources in three ways, considering the physical size of the facility, the number of employees, and the number of SKUs. We considered that fixed assets would be an indication of financial resources and the ability to leverage capital, which increases with size. Employees are also a resource to leverage and add complexity with increased numbers. Employees also represent a significant cost but this is reduced in developing countries like Mexico, where a daily wage might be near five US dollars. The number of products in terms of SKUs represents complexity, since more robust systems are required to manage larger varieties of products.

We compared the raw data in Excel to noted and patterns in the relationship between company size and the use of improvement methods. When we compared the physical, employee, and SKU size data against the use of an identified method we noticed that the smaller the resource, the less likely for the business to have indicated an observable method for improvement (see Figure 2 in Appendix B). Conversely, the larger the business, the more likely

the business was to have indicated methods that were observable, such was the case with all participating companies with large numbers of employees. In Figure 3 (Appendix B) we can see a clear example of how employee size contributed to the use of improvement methods. This finding seems obvious at first as larger companies can leverage more resources for improvements. However, as companies grow their net profit margin decreases creating more pressure to find operational improvements and competitive advantage. A study of firm dynamics by Statistics Canada demonstrated this nicely (Statistics Canada, 2012) and made us wonder if it was only because of reduced profit margins that companies pursue improvement methods.

We considered the total number of businesses surveyed versus the methods identified, noting differences in responses between small and large business. A notable difference between large and small business was in the question regarding the "driving need for improvement". In this question each of the large business participants used the word "competition" to describe their need for improvements, while small businesses used words such as improving quality, cost, and increasing sales. This seemed significant because the needs of a business changes as it grows and so does the management focus. In this case, large business seemed to have the operational effectiveness of quality, cost, and market share under control, while smaller businesses were still struggling with these basic processes. Ironically, processes and their improvements are still things that managers of larger businesses should be concerned about instead of the "competition". Armstrong and Green (2007) argued the "competitor-oriented" (p. 2) focus of companies is still held by management and how it inevitably damages profitability. The more we focus on the competitor the more similar we become and hence the greater the competition.

Skills and knowledge

Our findings concurred with a report conducted by the Canadian Logistics and Skills Committee, a part of the Lean Logistics Technology Roadmap project and funded by the Government of Canada. The report indicated that at least 40% of employer respondents said education and personnel are difficult to find. This report had mixed views from industry though, suggesting that while skills and education in supply chain are required, businesses don't necessarily value those skills. The report was definitive in the lack of programs and infrastructure to accommodate the SME sector (The Canadian Logistics Skills Committee, 2005).

The three opportunities or constraints we asked the participants for made-up our second analysis. To understand these comments we used Nvivo™ software to code the responses and created 19 codes with 133 reference points. We then looked at the top four codes which were: skills and knowledge; labour; operational systems; and "none". After comparing the coding we found that most reference could be aggregated into three of the original categories with *skills and knowledge* as the primary category containing *operational systems*. Skill and knowledge was the single biggest challenge for participants and covered a large range of unresolved issues. For example, one business owner talked about succession planning and the need to hire a manager to move the business forward but was unsure how to do it effectively. The issue wasn't about hiring a manager as much as lacking the operational skills for the business to improve. Others mentioned not having quality systems in place or how to manage materials and payment terms. Many areas of operations were addressed by participants that covered operational systems like inventory management or quality assurance. A word frequency analysis highlighted the most frequent word used as "lack" which described the things most participants did not have, in terms

of having the skills or knowledge to improve, such as leadership, processes, or efficiency measures. Interestingly, the psychosocial roadblock was that all participants gave some reason other than their own limits, often pointing the finger at subordinates or those outside of their control.

For the labour category, we noted that most of the 24 references were from small businesses with the exception of two large businesses. The difference between the small and large business regarding labour was about performance and regulation. The small businesses often complained about staff performance and attitude expressing thoughts like, "people do not want to work or do not care much" versus the larger businesses which had issues around health care, skills, and union restrictions. At least 10 of the 37 participants talked directly about staff availability and challenges in recruitment.

The final category with 14 references was *none*. This was an interesting category because it demonstrated a lack of problem or opportunity identification. Four participants had at least two-none-responses with a total of 11 participants not being able to identify three problems or opportunities. For example, one production facility had a "none" response, yet during the tour it was clear that quality, logistics, seasonality, and process efficiency were basic challenges that were not being addressed. The data on none response to challenges became important as we toured the facilities noting common challenges. Often, challenges were evident when observing waste, bottlenecks, unintentionally idle work stations, unclear work procedures, and unnecessary buffering inventories or work-in-process. The admission by participants that they could not think of any other problems or opportunities seemed to come with one primary characteristic, problems they did express were out of the manager's control, such as regulation, weather, people's attitudes, and safety. For example, one owner only identified a problem by blaming the

weather because it slowed fermentation of the product and there was nothing they could do about it. This dramatically highlighted the lack of knowledge of the management in finding improvement opportunities, particularly when they took a position of non-accountability. The issues that managers did not express accountability for occurred in 20 of the 37 participants with 34 of the 40 reference points coming solely from small business participants in each region.

Observed implementation

Our observations of the facility tours were recorded after the tour was complete and without the participant attending. We considered the questionnaire in the context of the tour and gave a rating if there were no indications of improvement methods; if there were an indication by the participants of methods being used but only partial implementation; and if we could see significant implementation. As an example, one business with several thousand employees suggested that they used Lean manufacturing techniques but during the facility tour we could only see attempts, such as "5s" posters in Japanese (not Spanish or English) with no visual controls, sorting, or ordering to improve work efficiency. We deemed this partial implementation. The term 5s comes from the Toyota Production System and is accepted as the first step in implementation for Lean manufacturing. As alluded to in Figure 1 and 2 of Appendix B, we found that small business participants did not have any significant improvement method implementation. In total, 27 participants had no observable implementation of improvement methods, 9 had some evidence of partial implementation of improvement methods, and only 4 had significant, observable implementation of improvement methods.

We found that the availability of resources in terms of physical size, employee count, and complexity of product mix was expressed by a greater understanding and use of improvement methods. We also discovered that managers who didn't have answers often blamed something or

someone that they felt was outside of their sphere of influence, such as weather or poor employee attitude.

Importance, Limitations, Future Research

The importance of this study was understanding that the basics of operational competitiveness has not been well adopted among the participants we surveyed and that the issue of SME competitiveness has, at its root, lacked systemic use of methodologies for improvement. We know that new strategies are developed for large, global corporations that have these methodologies in use because of the need to compete and tighter profit margins. But it's the small and medium sized companies that feed resources into these major organizations that create a strong chain, yet popular literature does not focus on this. It is also the SMEs that still need to practice the basics of operational improvement methods. Hawkins (2001) noted that "alongside larger companies, SMEs have a vital role to play in the effective operation of these supply chains, as satisfying the demands of any market rarely depends upon a single organisation" (p. 1). Hawkins had discussed how the links between these companies creates the overall strength of the industry.

The limitations of this research were too many and too broad; simply, the mode for conducting the research caused us difficulty as we often found ourselves in very dangerous locations. For example, on one occasion in a Central American industrial zone we arrived to a scheduled interview around 4 pm. A guard with a shotgun came from behind a wall and told us he would watch our equipment until it was dark and then he had to get behind the wall again for his own safety. These kinds of safety events plagued our research and made taking interviews difficult. Our design did not look closely at the reasons why managers used or did not use improvement methodologies. This may have brought much more meaningful conclusions to why

participants did not use, or know about the various improvement methods. It would have been more meaningful if the participant selection only included one kind of industry (i.e. food manufacturers) and focussed more on the manager's perceptions of improvement methods. That would have helped to better understand the socio-technical constraints within the culture and processes within a small scope. Additionally, we were not able to collect more specific data on the facility activities that highlighted the methods used or their potential, which could have given better insight into reasons for adopting any particular method. This had a negative effect on being able to demonstrate how improvement methods could be effective for any company and to gain insight into why they are not used.

Future research should look at what specific barriers to SME acquisition of skills and knowledge exist regarding operational skills and improvement methodologies. Understanding how SMEs are impacted by their location and relationship with other businesses or larger companies could indicate some reasons why lack of skills and knowledge for growth and competitiveness exist. Finally, researching the relationship of business growth and productivity in SMEs and if growth is a necessary component to support a community or economic stability, which would bring new thinking around why we try to improve.

REFERENCES

- Armstrong, J. S., & Green, K. C. (2007). Competitor-oriented objectives: The myth of market share. *International Journal of Business*, 12(1), 117-136.
- CCC. (2013). *Top 10 barriers to Competitiveness*. Ottawa: The Canadian Chamber of Commerce. Retrieved from http://www.chamber.ca/advocacy/Booklet_Top_10_Barriers_2013.pdf
- Glesne, C. (2011). *Becoming qualitative researchers: An introduction* (4th ed.). (P. Smith, Ed.) Boston: Pearson Education Inc.
- Government of Canada. (2012b, 08 03). *Industry Canada*. Retrieved 09 29, 2012, from Key Small Business Statistics July 2012: <http://www.ic.gc.ca/eic/site/061.nsf/eng/02715.html>
- Hawkins, L. (2001). *Fundamental productivity improvement tools and techniques for SME*. Loughborough: PRIME Faraday Partnership.
- Hayes, R. H., & Pisano, G. P. (1994). Beyond world class: The new manufacturing strategy. *Harvard Business Review*, 72, pp. 77-86.
- Jansen, H. (2010). The logic of qualitative survey research and its position in the field of social research methods [63 paragraphs]. *Forum: Qualitative Social Research*, 11(2). Retrieved from <http://nbn-resolving.de/urn:nbn:de:0114-fqs1002110>
- Manyika, J., Remes, J., & Dobbs, R. (2015b, January 20). *The productivity challenge of an aging global workforce*. Retrieved from Harvard Business Review: <https://hbr.org/2015/01/the-productivity-challenge-of-an-aging-global-workforce>
- Manyika, J., Woetzel, J., Dobbs, R., Remes, J., Labaye, E., & Jordan, A. (2015a). *Can long-term global growth be saved?* McKinsey Global Institute. Retrieved February 12, 2015, from http://www.mckinsey.com/insights/growth/can_long-term_global_growth_be_saved
- Marshall, M. N. (1996). Sampling for qualitative research. *Family Practice*, 13(6), 522-525.
- Na'slund, D. (2008). Lean, six sigma and lean sigma: Fads or real process improvement methods? *Emerald Group Publishing*, 14(3), 269-287. doi:10.1108/14637150810876634
- Padachi, K. (2006, October). Trends in working capital management and its impact on firms' performance: An analysis of mauritian small manufacturing firms. *International Review of Business Research Papers*, 2(2), 45 -58. Retrieved from <http://www.bizresearchpapers.com/Kesseven.pdf>
- Reason & Bradbury (Eds.). (2008). *The Sage handbook of action research: Participative inquiry and practice* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Statistics Canada. (2012, 07 31). *The Daily*. Retrieved 09 03, 2012, from Study: Firm dynamics: Variation in profitability across canadian firms of different sizes, 2000 to 2009 (Catalogue number 11-622-M2012026): <http://www.statcan.gc.ca/daily-quotidien/120731/dq120731c-eng.htm>
- Taylor, F. W. (1911). *The principles of scientific management [Kindle edition]*. A public domain book. Retrieved from www.amazon.ca
- The Canadian Logistics Skills Committee. (2005). *Strategic human resource study of the supply chain sector*. Retrieved 09 09, 2012, from Canadian Supply Chain Sector Council: http://www.supplychaincanada.org/assets/CLSC_summary_report.pdf
- Wicks, P. G., Reason, P., & Bradbury, H. (2008). Living inquiry: Personal, political and philosophical groundings for action research practice. In P. Reason, & H. Bradbury (Eds.), *The Sage handbook of action research: Participative inquiry and practice* (2nd ed., pp. 15-30). Thousand Oaks, CA: Sage Publications.

World Economic Forum. (2012). *The global competitiveness report 2012–2013*. Geneva: World Economic Forum. Retrieved from http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2012-13.pdf

APPENDIX B: IMPROVEMENT METHODS BY COMPANY SIZE

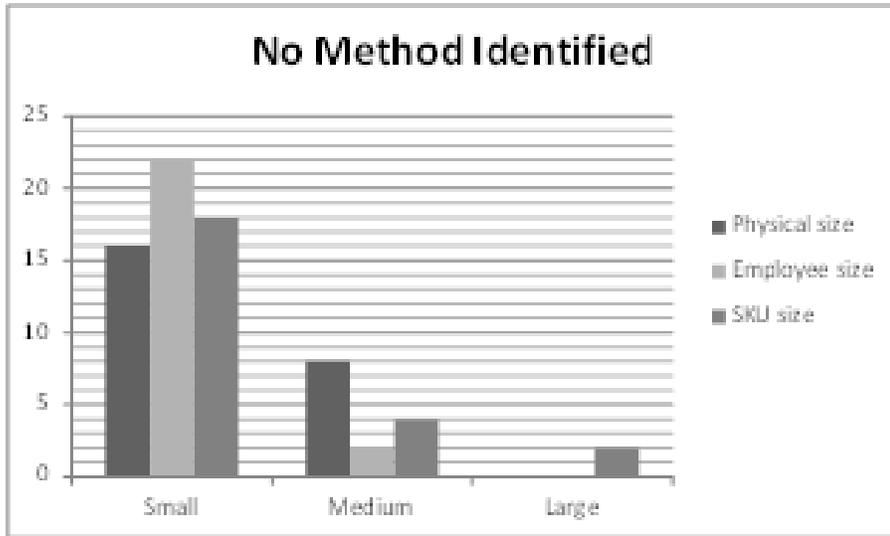


Figure 1 No improvement methods identified by the participants by size category

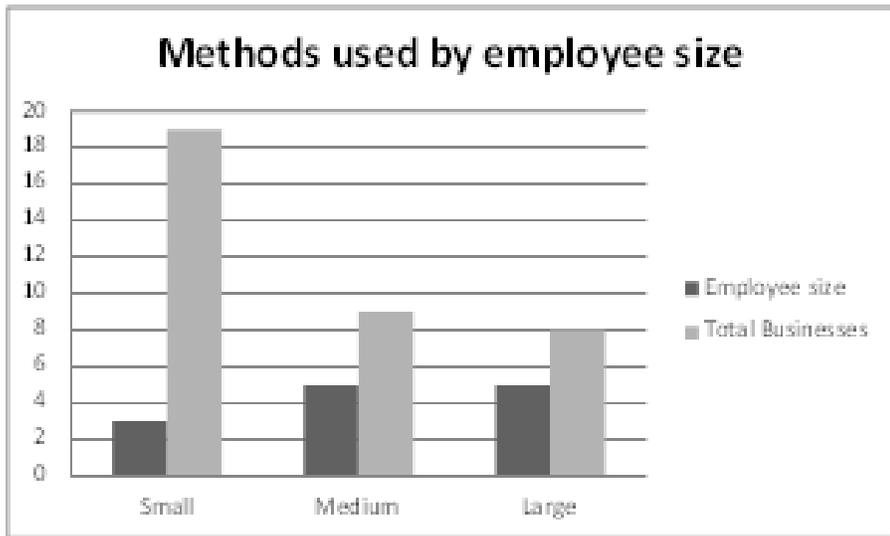


Figure 2 Improvement methods identified by employee size