

5S Improvement Tool or Business Strategy: Comparing Application and Understanding within Australian and New Zealand to Japan

Author

Kobayashi, Kaoru, Gapp, Rod, Fisher, Ron

Published

2006

Conference Title

4th ANZAM Operations Management Symposium 2006 Operations: Strategy, Systems and Networks Proceedings

Version

Accepted Manuscript (AM)

Rights statement

© 2006 Australian & New Zealand Academy of Management. This is the author-manuscript version of this paper. Reproduced in accordance with the copyright policy of the publisher. Please refer to the conference's website for access to the definitive, published version.

Downloaded from

<http://hdl.handle.net/10072/13243>

Link to published version

<https://www.anzam.org/events/types/events-conference/>

Griffith Research Online

<https://research-repository.griffith.edu.au>

**5S IMPROVEMENT TOOL OR BUSINESS STRATEGY: COMPARING
APPLICATION AND UNDERSTANDING WITHIN AUSTRALIAN AND NEW
ZEALAND TO JAPAN**

Kaoru Kobayashi, Department of Management, Griffith Business School, Griffith University,
PMB 50, GCMC BUNDALL QLD 9726 AUSTRALIA
+617 55529022, k.kobayashi@griffith.edu.au

Rod Gapp, Department of Management, Griffith Business School, Griffith University,
PMB 50, GCMC BUNDALL QLD 9726 AUSTRALIA
+617 55528767, r.gapp@griffith.edu.au (Author for correspondence)

Ron Fisher, Department of Management, Griffith Business School, Griffith University,
PMB 50, GCMC BUNDALL QLD 9726 AUSTRALIA
+617 55529022, r.fisher@griffith.edu.au

ABSTRACT

This research provides an understanding of a Japanese management approach, '5S' and its application in Japan, Australia and New Zealand. Organisational Web pages from all three countries were compared via a qualitative content analysis to assess the nature of the adoption of 5S in each location. The research found that Japan emphasised 5S as a management strategy, whereas 5S in Australia and New Zealand is viewed as a workplace tool for improvement or daily operation. The findings suggest that a holistic understanding and application of 5S provides a problem solving intervention at the system or process level inline with lean management philosophies.

Keywords: 5S, Strategy, Japanese Management, Lean, Philosophy

ABSTRACT

This research provides an understanding of a Japanese management approach, '5S' and its application in Japan, Australia and New Zealand. Organisational Web pages from all three countries were compared via a qualitative content analysis to assess the nature of the adoption of 5S in each location. The research found that Japan emphasised 5S as a management strategy, whereas 5S in Australia and New Zealand is viewed as a workplace tool for improvement or daily operation. The findings suggest that a holistic understanding and application of 5S provides a problem solving intervention at the system or process level inline with lean management philosophies.

Keywords: 5S, Strategy, Japanese Management, Lean, Philosophy

INTRODUCTION

This paper investigates the ways in which the 5S concept (5S), a Japanese management approach, has been understood and implemented by organisations in Japan, Australia and New Zealand. The 5S was initially based on a Japanese acronym for *seiri* (organisation), *seiton* (neatness), *seisō* (cleaning), *seiketsu* (standisation) and *shitsuke* (discipline), which are embedded in Japanese everyday life. Since World War II, 5S has mainly been applied to business environments through a framework proposed by Takashi Osada [36].

The current literature has deficiencies in the applicability of 5S when transferred from one country to another. When the field of operation management is investigated the Western literature refers to 5S as just 'housekeeping' (e.g., [1][8][9]) that assists operational efficiency. While this is a part of 5S, it is limited in its development and understanding as this research highlights the distinctive views between '5S as a strategy or management philosophy' and '5S as a tool or technique' in order to provide a more insightful view of its role in effective operation management.

World Wide Web (Web) pages of Australia and New Zealand organisations were compared to Japanese's Web pages via a qualitative content analysis. The results indicated that in Japan 5S appeared to be a philosophical concept for improvement requiring participation both at work and in the home. In contrast, organisations in the Australia-New Zealand area (ANZA) adopted 5S as a cleaning technique for the workplace. These findings suggest that greater understanding of 5S as a management strategy or philosophy would provide additional opportunities for organisations in the ANZA through increased employee commitment, greater productivity and profitability as well as corporate sustainability.

BACKGROUND

With 0.3 percent of the world's land mass and 2.3 percent of its population [19], Japan is a small country. However, in 2001 it had 14 percent of the total world GDP, second to the USA with 30 percent [19]. Japan was a world leader in manufacturing industries, in particular Japanese car production plants lead in productivity [13]. Japanese companies operating overseas have also achieved high levels of productivity and profitability [19]. However, the success of Japanese companies in the USA, compared with some USA owned and operated companies, has prompted the question "how well do native Japanese practices transfer to other countries?" [16]. The implications are that the benefits of Japanese work strategy and

practices have not been properly understood and implemented. One approach in the West is ‘lean thinking’ [45], a concept based on Japanese philosophy and work practices of which an integral part is the 5S concept.

The Origin of 5S

The 5S, (*seiri, seiton, seisō, seiketsu* and *shitsuke*) as a philosophy of life is fundamental to Japanese culture and society [35]. The implementation of 5S activities is easy when people realised their value. At both individual and organisational levels, 5S engages improvement activities within any environment including: homes, schools, communities and workplaces, regardless of size or type [10]. The implementation of 5S can uncover hidden problems that may otherwise remain unnoticed [35]. The benefits of implementing 5S are summarised as:

- *Cleanliness (seiri and seiton)* – to maximise effectiveness, contribute to a healthier life and reduce crime (due to enhancing transparency);
- *Orderliness (seisō and seiketsu)* – to maximise efficiency and effectiveness, reduce people’s workload, reduce human errors (due to simplifying processes); and
- *Discipline (shitsuke)* – to increase the level of morality and ethics and to increase minimum standards through training and education.

Each of the terms comprising 5S is widely understood in Japan as a method of improving lifestyle [36]. Also the practice of 5S is recognised as a group of organisational and cleaning activities that shape basic morality and ethics in: the workplace, at school, and in the home [10]. The philosophical concept of 5S has been embedded in Japanese society through the principles of Shintoism, Buddhism and Confucianism for hundreds of years [10]. The values of cooperation, trust, self-restraint, harmony and organisational loyalty are advocated by traditional Japanese society. Shintoism, Buddhism and Confucianism have all contributed to the formation of this culture [44].

Shintoism emphasises the importance of cleanliness of mind where using other people for one’s self-interest is considered ‘unclean’ [44]. Confucianism introduced from China and then redeveloped in Japan emphasises orderliness. Orderliness based on the Japanese Confucianism has an emphasis on community values [44]. Both Buddhism and Confucianism share spiritual ideals that derive fortitude from self-discipline. These combined ideals of Shintoism, Buddhism and Confucianism are often denoted by *dō* (the way or philosophy), such as *bushidō* (the way of the samurai), *shintō* (the way of the Gods: Shintoism), *butsudō* (the way of the Buddha: Buddhism), and other martial arts, including *kendō*, *jiūdō*, and *karatedō*, which are intended to train the body and mind through discipline [42]. For the Japanese 5S is a holistic application used to raise moral and ethical standards, grounded in the philosophical assumptions of Shintoism, Buddhism and Confucianism. The 5S is strongly associated with the constitution of Japanese culture and society.

The Components of the 5S

In linking the 5S philosophy to the workplace, Osada [36] provided the following definitions and descriptions for each of the activities. The order of the activities is not important but all are linked and implemented concurrently and cyclically as shown in Figure 1.

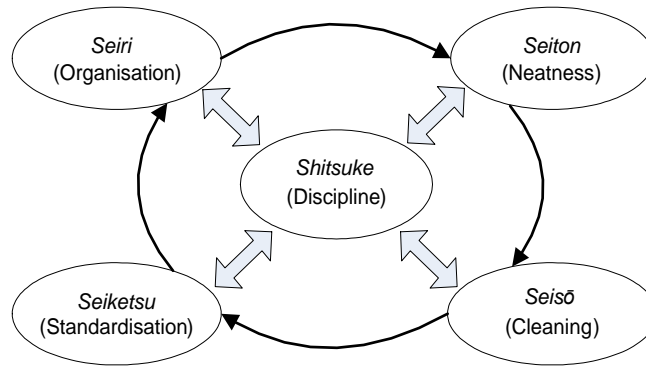


Figure 1. Osada’s view of the 5S concept (Adapted from: Osada, 1989)

The first S *seiri* represents ‘organisation’ and means “to put things in order—to organise them—in accordance with specific rules or principles” [36, p.25]. This begins with distinguishing between what is necessary and unnecessary in order to create a system that works effectively. The second S *seiton* means ‘neatness’, and aims to have things in the right place or right layout so people can obtain and use whatever they need quickly. To do this prioritising of goods/equipment/information to maximise ease of location is important. This requires repetitive and continuous rearrangement activities to achieve improvement in layout and design [35]. Functional layout is also important, not only to maximise efficiency but also to improve quality. The key questions of *who, what, why, where, when* and *how* [26] should be asked in respect of each item and information.

Seisō the third S means ‘cleaning’, and emphasises self-inspection, cleanliness and creating a faultless workplace. Inspection here has particular relevance to machines in a factory. When dealing with high-tec machines, appearing to be clean is not enough. A particle of dust, which is impossible to remove by only sweeping, can cause damage. Active self-inspection of such machines by operators and embedding quality into each work process increases their working life and performance, avoiding breakdowns and downtime in operations. This activity includes the maintenance of computing equipment in terms of both hardware and software. The fourth S *seiketsu*, ‘standardisation’ is at least continuously maintaining the first three ‘S’: *seiri*, *seiton* and *seisō*. It emphasises both “personal cleanliness and the cleanliness of the environment” [36, p.31]. Here, innovation and ‘visual management’ (making things clearly visible using colours, tags, logos or symbols) improves the effectiveness of *kaizen* (making things better for everyone in his interpretation).

Finally, the fifth S *shitsuke* is the most critical part in 5S means ‘discipline or training’. The word *shitsuke* originated from ‘fitting a *kimono* (Japanese traditional cloth)’; if it is done properly, the *kimono* can be properly sewn. It is “the basis of civilisation” [36, p.32] in Japan. In this way, pre-established behavioural patterns evolve naturally rather than being dictated. This requires proactive changes in people’s behavioural patterns at all levels within an organisation to achieve goals effectively. This concept is fundamental to Japanese thinking of ‘doing the right things in everyday life in the right way’ [44]. This makes 5S cost effective in Japanese companies as its does not require any initial outlay [35].

In the workplace, 5S is used “to organise the workplace, to keep it neat, to clean, to maintain standardised conditions, and to maintain the discipline that is needed to do a good job” [36, p.x]. The practice of 5S increases ‘transparency’ in an organisation ensuring a good first impression of the workplace by visitors, particularly potential new customers. The successful

implementation of 5S increases not only efficiency, as seen in productivity and quality, but also organisational effectiveness through “the synergetic (or cooperative) effect” [36, p.1] via total participation. The 5S program core is total participation and the ‘synergetic effect’ creates a strong workplace commitment toward organisational improvement activities. This leads to a strong organisational culture through the bottom-up approach. This approach also assists in the formulation of organisational strategy [35].

Business Applications of 5S in Japan

The aim of improving quality was introduced from the US to Japan by Sarasohn, Deming, Juran and Crosby, from the late 1940s to the early 1950s [11][14]. Initially, various plant maintenance concepts (preventive, periodic, predictive and corrective maintenance) were imported to Japan from the US [33]. The use of 5S in Japanese business became evident at this time [10] and was expanded through the innovative concept of total productive maintenance (TPM) which was developed in Japan at Nippondenso [33] and included 5S as a platform for TPM implementation. Later, the concept of 5S was integrated with *KAIZEN* (continuous improvement) philosophy [26] and then implemented at the Toyota Motor Corporation as part of their production system, namely Toyota Production System (TPS) [32]. Japanese professionals and academics [4][17][18][31][46] have studied and discussed the significance of 5S in the field of operations management, as well as contributing to its development and evolution.

All of these systems including TPM, quality improvement practices, *KAIZEN*, JIT and others have been adapted and integrated into lean production; where the term ‘lean’ is used mostly in the West [11]. The concept of ‘lean thinking’ developed by Womack and Jones [45, p.15] states “[lean thinking] provides a way to do more and more with less and less—less human effort, less, equipment, less time, and less space—while coming closer and closer to providing customers with exactly what they want”. In this context, 5S facilitates teamwork, which can be carried out through a series of activities, such as eliminating wastes that contribute to errors, defects, and injuries [30].

5S has been incorporated successfully into Japanese management practices to improve the quality of the working condition and environment through the continuous effort to attain high standards of organisation and cleaning activities. The notions of quality improvement and lean thinking are strongly linked to Japanese operations management [30]. W. E. Deming [12, p.2], the major contributor to Japanese quality activities, stated that “improvement of quality transfers waste of man-hours and of machine-time into the manufacture of good product and better service. The result is chain reaction—lower costs, better competitive position, happier people on the job, job and more jobs”. Deming’s statement has extended to the concept of ‘lean thinking’ to eliminate waste, which refers to “any human activity which absorbs resources but creates no *value*” [45, p.15]. As lean thinking involves a way to convert waste into value, “in striking contrast with the recent craze for process reengineering, it provides a way to create new work rather than simply destroying jobs in the name of efficiency” [45, p.15].

As a management approach, 5S plays an important role in quality improvement practice and lean thinking by determining where the waste exists and how organisations convert waste into value [30][45] For value creation, the fifth component of 5S, *shitsuke* (training/discipline) is the most crucial in regards to raising workers’ motivation and active participation to management activities. It also requires a combination of committed

management, proper training, and a culture that makes sustaining improvement a habitual behaviour from the shop floor to management [30][32].

The Limited Interpretation (Understanding) of 5S outside Japan

The 5S was actively promoted to the West by Hirano [17][18], who used English language equivalents (sort, set, shine, standardise and sustain) and proposed that six main benefits can be obtained when 5S is successfully implemented: (1) product diversification; (2) high quality; (3) lower costs; (4) reliable deliveries; (5) improvement of safety; and (6) higher availability rate. A common western approach is to create an organisational structure for a 5S promotion campaign and should include: a headquarters, an executive council, subcommittees and a patrol team. To promote 5S within the organisation, top and senior managers must take initiatives and provide the following: implementation schedule, campaign materials, in-house training and periodic inspections and evaluations [17].

The above approach, when compared to the philosophical basis in Japan, may be too simplistic and neglect an adequate transformation of managerial approaches from one country to another. This is supported by Hirano [17, p.28] who stated that the significance of 5S is as a tool for “corporate survival” where application of the tool requests explicit understanding of the tool. In this context, the successful 5S implementation requires a “practical and comprehensive manual [to provide] know-how” (p.xiv). Gapp [15] goes further and argues that practices based on those manuals tend to lack the consideration for human aspects (creativity, learning and cooperation) and therefore may lead back to a management approach based on ‘scientific management’ or ‘Taylorism’. This is not the primary purpose (objective) of 5S when it is pursued as a management strategy or philosophy.

As Hirano [17][18] claimed that 5S can be used as a solution to an inventory flow, inefficient process and ineffective audits, outside Japan researchers in operations management have included the term in the fields of JIT, TPM and TQM. For example, 5S has been widely used in operations management systems where it has been referred to as ‘part of a series of quality initiatives’ [22][38], ‘a good housekeeping tool’ [1][8][9], ‘an effective cleanliness program’ [43], ‘a system for maintaining a good working environment’ [27], ‘a method towards sustainability’ [5][6] and even ‘part of a world class strategies’ [3]. However, all of those referred 5S to ‘a tool or technique’ without the precise descriptions.

Although 5S is defined as ‘a tool or technique’, Ho [23, p.311] supported Osada’s perspective and acknowledged, “Most Japanese 5-S practitioners consider the 5-S useful not just for improving their physical environment but for improving their thinking processes as well... Many of the everyday problems could be solved through adoption of this practice”. Ho suggests that 5S can be used for ‘workplace learning’ [20], ‘industrial management’ [21], and ‘the process in organisational change’ [24][25]. The major difference between the Japanese and Western approach is the degree of total participation and employee involvement in the implementation process. Japanese management establishes a framework first which enables the message to be conveyed across the entire organisation and thus encourage total participation and a systematic implementation process [20].

Despite the significance of 5S in the field of operations management, there appears to be a scarcity of empirical research in the applicability of the 5S concept in the non-Japanese countries. This partial or incomplete understanding and interpretation of the concepts behind 5S could have implication on the final outcome of its implementation outside Japan [30].

This may cause business failure, or at least lead to a lower quality, less healthy and insecure work environment. The Japanese perceive 5S as a holistic concept that requires a thorough understanding before it can be applied. In other countries the lack of such an approach may lead to the implementation being applied partially and incompletely.

METHODOLOGY

The literature suggested that the complexity of 5S was not fully appreciated at the time of its adoption by Western organisations. This created an implementation that focused on special applications rather than a detailed understanding. An aim of this research was to understand the approaches taken to implementing 5S, by comparing Japanese with non-Japanese countries through qualitative methods of analysis. In order to achieve this it was decided to investigate non-reactive or pre-existing messages about 5S from various countries, rather than responses or reactions to them therefore organisational Web pages were selected as the research context. This study also required knowledge of the words commonly used by organisations. Words or messages in Web pages experience less intervention by translators or editors, as opposed to other paper-based materials, which was ideal for the purposes of this study in terms of organisations' intentions [2]. Therefore, qualitative content analysis was adopted for this study.

Of several popular search engines (Excite, Altavista, Google and Yahoo), only Yahoo had the capability of nominating both regions and languages. Three countries were studied through Yahoo with ANZA representing English-speaking countries. As the unit of data collection, only organisational Web pages were included. Irrelevant Web sites made by individuals (Web diaries or Web logs) and those that featured discussions (Web forums, discussion boards, or guest books) were excluded. Selected Web pages incorporated the word '5S' on the title of the page, on the section heading or with special emphases (in bold, coloured, highlighted or in a different font size).

The data collection procedure adopted a purposive sampling technique to specify Web pages that only related to 5S. Data collection commenced by going to the Yahoo site [<http://yahoo.com>] and selecting 'Advanced Search' the specification of both language and region. Then a title and a summary of each Web page were manually examined and all irrelevant Web pages were removed. Pages were checked according to their accessibility. Web pages under construction, with limited access, containing a discussion forum or board, or containing only graphics were also removed from the list. At the end of the entire process, 15 pages from the ANZA and 84 pages from Japan were prepared for analysis. Leximancer program, the data-mining software, was used a qualitative analysis tool. Leximancer's learning capability generated and put similar words into groups automatically as synonyms, then represented them as a 'concept' [40].

In computer-aided lexical analysis, the latent content or meanings of words form the unit of analysis [28]. The initial execution of Leximancer identified 24 concepts. The number of concepts to be considered by Leximancer was increased incrementally and the program again executed. This was continued up to a setting of 50 concepts. After these iterations it was observed that no new concepts above 37 were evident; therefore the concepts identified in the analysis were deemed to be saturated by the researchers, as proposed by Strauss and Corbin [41]. All 15 pages from the ANZA were used for the analysis, but there was a point of diminishing returns after 24 items in Japanese Web pages as little new information was obtained. A feature of Leximancer is its ability to display concepts and the relationships

between them, in a conceptual map [39]. The type of mapping selected for this study was ‘Gaussian’, which emphasises similarities of between concepts. Although co-occurrence was not a central focus for this study, Leximancer also provides a ‘Linear’ type of mapping which emphasises co-occurrence between concepts [40].

The most critical issue in this study in regard to content validity was the accuracy of translation. To check this validity, the research used an adaptation of Brislin’s [7] ‘back translation’ method for checking the accuracy of the translation of Japanese Web pages. This adapted method involved the combined use of an electronic dictionary, machine-translation software program and a Web-based translating service. This technique seemed complicated but was both time and cost effective. ‘King of Translation’, a machine-translation program, was initially used to translate each Japanese Web page into English. When the program failed to find matched words, the program left those words as Japanese. Words identified in this way were translated individually into English by the use of an electronic dictionary. Then, all the Japanese Web pages were independently translated into English by the use of a Web translation service (provided by Google [<http://www.google.com>] and Altavista [<http://babelfish.altavista.com>]). A comparison between the use of ‘Internet King of Translation’ [IBM Japan] and the Web translation services was satisfactory, except for some industry-specific terminologies. An independent translator, who participated in this study voluntarily, confirmed those terminologies and the accuracy of the machine translation. The validity check was fully satisfied.

RESULT

The most frequently occurring concepts in Japan were: *improvement, place, cleaning (seisō), management, time, activity* and *method* whereas those in the ANZA were: *place, work, cleaning (seisō), equipment, productivity, quality* and *workplace*.

In Japan, *improvement* had strong co-occurrence with *rearrangement (seiton)*, which is rooted in Osada’s notion of repetitive and continuous rearrangement activities for improvement [35]. For example, some Japanese Web pages expressed it as “Improvement must come from repetitive rearrangement activities”. With this description most Japanese organisations combined *rearrangement (seiton)* with the first S, [put-in] *order (seiri)* and referred to it as the ‘*seiri-seiton*’, which refers to orderliness [35]. This connection was not found from the ANZA Web material. The second frequently occurring concepts of *place* and *cleaning* had strong co-occurrence to each other as well as with *cleanliness (seikestu)*. This relationship can be interpreted in two ways: one is an activity (cleaning place) and another is a philosophical notion (cleanliness [of] place). The former was found from the ANZA as well as Japan but the latter was found only from Japanese organisations. Concepts associated with *management* found in Japan were *business* and *improvement*. *Time* was associated with *management*. *Activity* and *method* had strong co-occurrence with ‘5S’. The concept of *method* can be interpreted as a management strategy or philosophy as it included the words ‘philosophy’, ‘heuristic’, ‘enlightenment’ and ‘way’.

In the ANZA, the most frequently occurring concept of *place* indicated the location to put everything in the workplace, such as “Everything in its place” or “Clean working environments where everything is properly placed and where clear instructions are readily available tend to be a safe place to work in”. Other concepts of *work, cleaning (seisō)* and *equipment* were strongly associated with the above expressions, which can be interpreted as a work-related activity. Other concepts of *productivity, quality* and *workplace* were linked with

each other, such as “5S steps will increase productivity and quality” or “Clean workplace will increase productivity, quality and safety”. This can be interpreted as an outcome of implementing 5S.

Most concepts were clustered in four areas automatically by Leximancer (three of which are circled) and represent the perceptions to 5S between Japan and the ANZA, as shown in Figure 2.

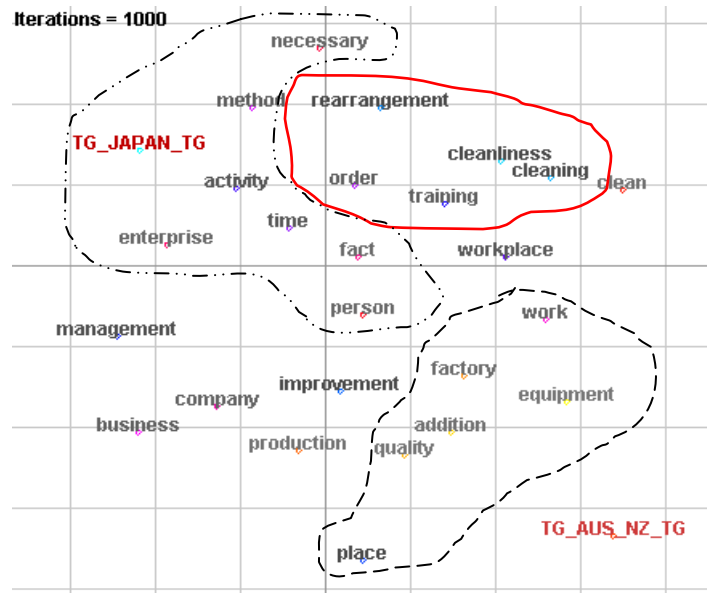


Figure 2. The conceptual map of the 5S concept

The upper right frame of figure 2 included each component of 5S: [put-in] *order (seiri)*, *rearrangement (seiton)*, *cleaning (seiso)*, *cleanliness (seiketsu)* and *training (shitsuke)*. While [put-in] *order (seiri)* and *rearrangement (seiton)* were placed near Japan, *cleaning (seiso)* and *cleanliness (seiketsu)* were located closely to the ANZA (indicated by AUS_NZ in the map). The lower right frame contained the frequently occurring concepts in the ANZA: *work*, *factory*, *equipment*, *addition* and *quality*. Within this frame the most frequently occurring concept was *work*. The upper left frame included the frequently occurring concepts in Japan: *necessary*, *method*, *activity*, *time*, *enterprise*, *fact* and *person*. Within this frame the most frequently occurring concept was *activity*. The lower left frame contained the concepts, which equally emphasised by both countries: *management*, *business*, *company*, *improvement* and *production*, as well as *workplace* and *clean* in the upper right frame. Within this frame the most frequently occurring concept was *business*, *management* and *improvement*.

DISCUSSIONS

Managerial Differences in the 5S Concept

Japan tends to recognise 5S as a management strategy or philosophy, whereas the ANZA is likely to consider 5S as a technique or tool. The results of the present study tend to reflect the West’s expectations of 5S: as a technique or tool that relates to Hirano’s framework that 5S contributes to achieving an organisational goal as well as increasing individuals’ productivity. Organisations with this objective are more likely to expect an affordable investment at the beginning with quick visible results. In fact, 5S should not require any financial outlays, it is

easy to understand and the outcome of implementing 5S has immediate effects [34][37]. On the other hand, thinking of 5S as a strategy or philosophy is related to Osada's framework along with the notion that 'our mind becomes clean, when the place is clean' [29][44], which would indicate an internal-realisation of the concept and self-motivation, which produces a "synergetic (or cooperative) effect" [36, p.1].

When 5S is seen as a technique or tool, it will provide some short-term impact but not assist in the development of the organisation. This research suggests that when 5S is used as a technique or tool, it contributes to the short-term results, which do not assist to motivate or empower employees. When 5S is used as a philosophy or methodology, it helps an organisation to achieve the creation of a synergetic effect and the development of life-long learning as a cornerstone for long-term success and sustainability.

Implications for Practice

From a managerial perspective, the findings presented in this study provide a link between theory and their current practice of 5S. The literature indicates that 5S contributes to an increase in productivity and operational efficiency, particularly in its country of origin. The study provides evidence for the 5S concept experiencing a significant level of managerial difference based on the country of application and the level of understanding. Therefore, it is suggested that 5S practitioners or trainers should consider various sources of information when implementing 5S, rather than simplified applications. In particular, it seems to be difficult for non-Japanese organisations to understand the importance of total participation in 5S. The development of an organisational culture aimed at achieving total participation would lead to the successful implementation of 5S.

This research further suggests that a more balanced understanding of both '5S as a way: management strategy or philosophy' and '5S as a technique or tool' can achieve the ultimate goal of 5S, which is a management approach to solving problems in the workplace at all organisational levels. In this study, only one organisation in the ANZA explained that training in 5S is "useful for all employees and is especially helpful to project leaders or supervisors responsible for integrating the 5S philosophy and 5S techniques into their work area". Such integrated thinking improves the comprehension not only of the 5S concept but also of other management approaches. 'One best way' approach is not applicable to the 5S implementation at all.

CONCLUSION

Little research has been conducted into the different ways in which 5S has been interpreted and implemented in non-Japanese countries compared with its original meaning. Investigation of the Web pages of businesses in Japan, Australia and New Zealand suggests significant differences in the way in which the 5S concept has been applied. In Japan, 5S has been embraced and implemented as a philosophy or way of life. In the Australia-New Zealand region, 5S has been implemented as a cleaning technique or tool.

Understanding 5S as a philosophy or way of life engenders notions of self-motivation, completeness and synergy, and is consistent with the approach suggested by Osada [35][36]. This holistic approach is evident in the manifest use of 5S as a philosophy in the words used in the Web pages of Japanese organisations. Businesses in the ANZA utilise 5S as a technique or tool. Using 5S in this way will provide some short-term impact but will not

assist in the development of the organisation. This research suggests that when 5S is used as a technique or tool, some level in organisational improvement is achieved. However, it neither influences organisational culture nor does it achieve synergies. Neither Australia nor New Zealand has seemed to embrace the 5S concept holistically. It does appear that the use of 5S as a philosophy, rather than just a tool, provides a platform for business success.

On the contrary, when 5S is used as a management strategy or philosophy it helps an organisation to achieve the creation of a synergetic effect and the development of life-long learning as a cornerstone for long-term success and sustainability. This then aids in the development and influencing of organisational culture.

REFERENCES

- [1] Ahmed, S. and Hassan, M. Survey and case investigations on application of quality management tools and techniques in SMIs. *The International Journal of Quality & Reliability Management*, 2003, 20 (6/7), 795.
- [2] Anderson, T. and Kanuka, H. *E-Research: Methods, strategies, and Issues*. Boston, MA: Pearson Education, 2003.
- [3] Ansari, A. and Modarres, B. World-class strategies for safety: a Boaing approach. *International Journal of Operations & Production Management* 17 (4), 389-398.
- [4] Aoki, K. *Teichi Kanri: 5S no genten: Kagakuteki Seiri-Seiton (Fixed Control: The Origin of 5S: Scientific Orderliness)*. Tokyo: Nikkan Kogyo Shinbun, 1989.
- [5] Bateman, N. Sustainability: The elusive element of process improvement. *International Journal of Operations & Production Management*, 2005, 25 (3), 261-276.
- [6] Bateman, N. and David, A. Process improvement programmes: A model for assessing sustainability. *International Journal of Operations & Production Management*, 2002, 22 (5/6), 515-526.
- [7] Brislin, R. W. Translation and content analysis of oral and written material. In Triandis, H. C. and Berry, J. W. (Eds.), *Handbook of cross-cultural psychology (Vol. 2, 389-444)*. Boston, MA: Allyn & Bacon, 1980.
- [8] Chin, K. S. and Pun, K. F. A proposed framework for implementing TQM in Chinese organizations. *The International Journal of Quality & Reliability Management*, 2002, 19 (2/3), 272.
- [9] da Silveira, G. J. C. Effects of simplicity and discipline on operational flexibility: An empirical reexamination of the rigid flexibility model. *Journal of Operations Management*, In Press, Corrected Proof.
- [10] De Mente, B. L. *Japanese etiquette & ethics in business (6th ed.)*. Lincolnwood, Illinois: NTC Business Books, 1994.
- [11] Dean, J. R. *Total quality: Management, organization and strategy (4th ed.)*. Mason, Ohio: Thomson South-Western, 2005.
- [12] Deming, W. E. *Out of the crisis*. Cambridge, MA: MIT Press, 1986.
- [13] EIU *The world's leading car plants: A comparative productivity audit*. *Motor Business International*, 1997, 124-134.

- [14] Foley, K. Revisiting the "Foundations" of quality management: Homer Who? Proceedings of the Forth International and Seventh National Research Conference on Quality Management, Sydney, NSW, 2000.
- [15] Gapp, R. The risk to organisational excellence by processes that limit managerial knowledge and perception. *Journal of Manufacturing Technology Management*, 2004, 15 (5), 387-393.
- [16] Halpern, M. Integrating the supply chain, Toyota's U.S. Advantage. *Computer - Aided Engineering*, 1999, 18 (9), 52.
- [17] Hirano, H. 5 Pillars of the visual workplace: The sourcebook for 5S implementation (Talbot, B., Trans.). New York: Productivity Press, 1995.
- [18] Hirano, H. 5S for operators: 5 pillars of the visual workplace (5S shido manual). New York: Productivity Press, 1996.
- [19] Hitomi, K. Efficiency analysis of Japan's industry and manufacturing. *Technovation*, 2004, 24, 741-748.
- [20] Ho, S. K. Workplace learning: the 5-S way. *Journal of Workplace Learning*, 1997, 9 (6), 185-191.
- [21] Ho, S. K. 5-S practice: A new tool for industrial management. *Industrial Management + Data Systems*, 1998, 98 (2), 55-62.
- [22] Ho, S. K. 5-S practice: The first step towards total quality management. *Total Quality Management*, 1999, 10 (3), 345-356.
- [23] Ho, S. K. Japanese 5-S - where TQM begins. *The TQM Magazine*, 1999, 11 (5), 311-320.
- [24] Ho, S. K. TQM and Organizational Change. *International Journal of Organizational Analysis*, 1999, 7 (2), 169-181.
- [25] Ho, S. K. TQM and strategic change. *Strategic Change*, 1999, 8 (2), 73-80.
- [26] Imai, M. *Kaizen: The key to Japan's competitive success*. New York: McGraw-Hill, 1986.
- [27] Krasachol, L. and Tannock, J. D. T. A study of TQM implementation in Thailand. *The International Journal of Quality & Reliability Management*, 1999, 16 (5), 418.
- [28] Krippendoff, K. *Content analysis: An introduction to its methodology*. Beverly Hills, CA: Sage, 1980.
- [29] Lebra, T. S. *Japanese patterns of behavior*. Honolulu: University of Hawaii Press, 1976.
- [30] Liker, J. K. *The Toyota way: 14 management principles from the world's greatest manufacturer*. New York: McGraw-Hill, 2004.
- [31] Mishima, H. *Seiketsu to eisei: 5S kara no misezukuri (Cleanliness and hygiene: Shop Management from 5S)*. Tokyo: Kindai Bungeisha, 1993.
- [32] Monden, Y. *Toyota Production System: An integrated approach to just-in-time (3rd ed.)*. Norcross, Georgia, 1998.
- [33] Nakajima, S. *Introduction to TPM: Total productive maintenance (Productivity Press, Trans.)*. Cambridge, MA: Productivity Press, 1988.

- [34] Nystuen, T. Big results with less. *Quality Progress*, 2002, 35 (10), 51-55.
- [35] Osada, T. *5S - Tezukuri no manajimnt shuho (5S - Handmade management technique)*. Tokyo: Japan Plant Maintenance, 1989.
- [36] Osada, T. *The 5S's: Five keys to a total quality environment*. Tokyo: Asian Productivity Organisation, 1991.
- [37] Parks, C. M. The bare necessities of lean. *Industrial Engineer*, 2003, 35 (8), 39-42.
- [38] Shari Mohd, Y. and Aspinwall, E. Case studies on the implementation of TQM in the UK automotive SMEs. *The International Journal of Quality & Reliability Management*, 2001, 18 (6/7), 722-743.
- [39] Smith, A. E. Automatic extraction of semantic networks from text using Leximancer. *Proceedings of the HLT-NAACL 2003 Human Language Technology Conference of the North American Chapter of the Association for Computational Linguistics*, Edmonton, Canada, 2003.
- [40] Smith, A. E. *Leximancer Manual (Version 2.0)* [PDF File installed with Leximancer program], 2004.
- [41] Strauss, A. and Corbin, J. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. Thousand Oaks, LA: Sage, 1998.
- [42] Sugiura, Y. and Gillespie, J. K. *A bilingual handbook on Japanese culture (2nd ed.)*. Tokyo: Natsume Books, 2002.
- [43] Tannock, J., Krasachol, L. and Ruangpermpool, S. The development of total quality management in Thai manufacturing SMEs: A case study approach. *The International Journal of Quality & Reliability Management*, 2002, 19 (4), 380.
- [44] Watsuji, T. *A history of ethical ideas in Japan*. Tokyo: Iwanami Shoten, 1952.
- [45] Womack, J. P. and Jones, D. T. *Lean thinking: Banish waste and create wealth in your corporation*. New York: Simon & Schuster, 1996.
- [46] Yamamoto, K. *Takaga souji to iunakare (Do not say it is just cleaning)*. Tokyo: Nihon Jitsugyo Shuppan, 1996.