

Article

Investigating the Implementation of Toyota's Human Resources Management Practices in the Aerospace Industry

Amal Benkarim * and Daniel Imbeau

Department of Mathematics and Industrial Engineering, Polytechnique Montreal, Montreal, QC H3T 1J4, Canada; daniel.imbeau@polymtl.ca

* Correspondence: amal.benkarim@polymtl.ca

Abstract: Many companies try to follow Toyota's production model to achieve better performance. In their attempts, however, they primarily focus on Lean Production tools, often overlooking the role of employees and HRM practices. In this work, we aim to investigate the implementation of Toyota's HRM practices in the aerospace sector. For this purpose, we used a qualitative methodology, whereby data were collected through semi-structured interviews with thirty office and production employees from a Canadian aerospace company. Our results show that the company under study adopted several of Toyota's HRM practices, including training, communication, respect, supervisor/manager support, fairness, and occupational health and safety. These findings underscore the importance of Toyota's HRM practices in the aerospace sector. Notably, however, not all of Toyota's HRM practices were adopted, and among those adopted, we found considerable differences in implementation. Overall, our findings provide novel insights into the implementation of HRM practices in the aerospace sector and highlight the flexibility in their implementation to adapt to the context of the target company.

Keywords: lean production; Toyota; HRM practices; continuous improvement; aerospace industry



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1. Introduction

Toyota is one of the most competitive and successful companies in the world thanks to its reliable products, high productivity and increasing profitability every year [1,2]. Its success is greatly attributed to its production system, known as Toyota Production System (TPS) or Lean Production (LP) as popularized by Womack and his colleagues in 1990 [3].

LP is an approach that aims to produce the highest quality products while using less resources (less human effort, less time, less manufacturing space, less waste, and less investments in tools and equipment) [1,3–5]. More specifically, LP seeks to achieve maximum efficiency while minimizing costs and reducing waste [6,7].

The success achieved by Toyota through the implementation of LP has attracted the attention of companies around the world and inspired them to follow its path. Although Toyota concisely specifies that LP is a socio-technical system encompassing both the technical and social dimensions [8,9], in their adoption of LP, the vast majority of companies place a disproportionate focus on the technical aspects of LP, neglecting its social side, which leads in most cases to their failure [10–12].

The technical dimension refers to tools, techniques and processes, while the social dimension refers to people-related issues [2,13]. These two dimensions are complementary in the sense that human resources (HR) are the ones who use these tools and techniques to make daily continuous improvements and thus achieve high levels of performance [12]. The important role of HR in LP has been emphasized by several authors [8,14–17], arguing that it is HR who bring LP to fruition by improving the workflow, solving problems, reducing errors, and eliminating non-value-added activities. Hence, the full benefits of LP cannot be achieved without proper treatment and effective management of HR [18]. As stated by the Drexel University School of Education: HR are the machines that make businesses

work; human resource management (HRM) is the practice of optimizing those machines for success (<https://drexel.edu/soe/resources/career-path/hrm-vs-hrd/>) (accessed on 17 February 2022).

While HRM practices are recognized as necessary for LP adoption and sustainability, they have seldom been studied in the literature. The few works [2,6,19–21] that investigated these practices stressed their contribution to the success of LP initiatives and concluded that companies contemplating a transition from mass production to LP should consider, among other things, the HRM practices used by Toyota, and adapt them to their organizational context and sector of activity.

Previous works have widely investigated LP in the automotive industry, with very little attention paid to other sectors (e.g., aerospace). In this direction, a study carried out by Marodin and Saurin [22] analyzing 102 articles to identify the domains of research related to the implementation of LP revealed that most works centered on electronic components and automotive sectors, with much less consideration for the aerospace industry. In the same direction, based on a review of 546 works on LP, Jasti and Kodali [23] reported that only eight of these works addressed the aerospace industry, confirming the scarcity of research on this sector.

Studies on LP in aerospace companies are even rarer when the focus is on HRM practices. To our knowledge, there are only two works that investigated the contribution of HRM practices to LP in the aerospace sector [6,24]. Both studies found that aerospace companies implement several of Toyota's HRM practices (e.g., training, communication, and supervisor/manager support), and further highlighted the importance of these practices during the transformation process. Nonetheless, due to the lack of research on this subject, it remains difficult to assess the projection and elucidate the adequacy of Toyota's HRM practices in other areas or sectors such as the aerospace industry. The aim of this study is therefore to investigate the implementation of Toyota's HRM practices in the aerospace sector. For this purpose, we address two research objectives. The first objective is to assess which of Toyota's HRM practices are adopted in one of the largest aerospace companies in Canada. The second objective is to explore how these practices are implemented.

The remainder of the article is organized as follows. The second section provides a review of LP in the aerospace industry. The third section outlines Toyota's HRM approach to provide an understanding of the way Toyota supports and incentivizes its employees to participate in the continuous improvement process. The methodology used in this research is described in the fourth section, and the findings are presented in the fifth section. The sixth section provides a discussion of our results, including challenges for future research. Finally, the seventh section concludes the paper.

2. LP in the Aerospace Industry

The transferability of LP practices to the aerospace industry has been debated in the literature [25]. Prior research highlighted the challenges and difficulties in transferring LP practices to an industry with considerable differences [25,26]. The widespread barrier to implementing LP in aerospace is the belief that LP is, to some extent, an "automotive industry idea" and that cannot be applied to the aerospace sector [27].

The implementation of LP in the aerospace industry started to receive considerable attention in the early 1990s when some LP-based aerospace companies emerged to confirm the adaptability of the aerospace industry to adopt LP practices [26,28]. These companies proved that, although LP was originally developed in the automotive industry, its principles can also be applied in the aerospace industry. This in turn enabled them to improve their outcomes and their competitive abilities [27,29]. Similarly to other countries, a number of aerospace companies in Canada also adopted the LP approach (e.g., Bombardier Aerospace, Pratt and Whitney Canada) [26]. In fact, the aerospace industry in Canada is a major source of employment, productivity, research, economic development, and trade (https://capitalhillgroup.ca/our_expertise/aerospace-sector) (accessed on 3 March 2022). According to the State of Canada's Aerospace Industry (<https://www.ic.gc.ca/eic/>

site/ad-ad.nsf/eng/h_ad03964.html) (accessed on 3 March 2022), this sector contributed over \$ 22 billion to the gross domestic product (GDP) and created close to 207,000 jobs in 2020. The Canadian aerospace industry is a world leader in several areas (e.g., in terms of export intensity and trade diversity) and an important contributor to the domestic economy [30]. The interest of this industry towards LP comes from the fact that they seek to maintain their competitiveness and continually reduce their production costs. Nevertheless, most companies, whether in Canada or elsewhere, have not achieved the results expected following LP implementation [27,31].

Research suggests that the main reason behind this is that companies are generally more interested in eliminating waste and improving efficiency, while less consideration is given to the human factor and the implementation of HRM practices that support the LP transformation [27,32,33].

3. Toyota's HRM Approach

The driving force behind LP is Toyota's on-going investment in the management of its HR, which promotes their adherence to the company's goals and values [1]. Toyota has established a set of management practices that is widely known to be effective in incentivizing employees to be proactive in the work environment and to continuously seek ways to participate in the improvement process. These practices include training, communication, respect, empowerment, job security, recognition, supervisor/manager support, fairness and occupational health and safety.

1. **Training:** Toyota stipulates that employees can only perform and make improvements if they are trained. For this reason, it provides them with different training approaches to improve their skills, including classroom training (i.e., developing an understanding of basic concepts), on-the-job development (i.e., learning by doing) and personal training opportunities (i.e., training is requested by the employee to meet a specific learning need) [8]. These trainings are designed to educate employees about the main challenges and opportunities of LP adoption and to provide them with the necessary knowledge on LP principles and methods [21]. Once employees understand the objective of LP and learn how to use its tools and techniques, their participation in the continuous improvement process becomes easier [21]. Classroom trainings are very helpful in providing initial awareness and information about basic LP concepts, particularly about the concepts of value-added activities and waste. This form of training, however, does not lead to culture change [34]. Theory-based trainings cannot alter employees' behaviors or habits and are unlikely to motivate them to make improvements or get involved in the new system [34]. According to Toyota, actual learning comes from performing (on-the-job development), which enables employees to embrace the new work approach and truly understand LP and its goals [1,8]. Liker [1] emphasized that, especially in the beginning stages of lean transformation, there should be at least 80 percent doing and 20 percent classroom training and informing. Overall, adequate and effective training in the context of LP is training followed by immediately performing or performing followed by immediate training [1];
2. **Communication:** Toyota recognizes the importance of sincere communication and is aware that communication is a two-way street that requires information sharing between team members and managers. In this line, Alex Warren, the former Executive Vice President of Toyota Motor Corporation Kentucky stated: "At Toyota, we simply place the highest value on our team members and do the best we can to listen to them and incorporate their ideas into our planning process" [1]. Toyota believes that two-way communication, especially face-to-face communication at Gemba (the place where the work occurs) is generally more effective since it provides opportunities to listen to employees and give them immediate feedback which can help in addressing process failures and improving tasks [8]. It should be noted that the communication system at Toyota is extensive and multifaceted. Typical internal communication

- methods include newsletters, bulletin boards, meetings, instant messaging, and the like [8], allowing the sharing of ideas, information, and opinions. Toyota managers believe that communication is the key to keeping employees working effectively within the company [1];
3. **Respect:** According to Toyota, respect is the foundation of relationships with colleagues and with others [35]. Toyota considers that everyone needs to be respected for both what they contribute and who they are, including their ideas and their cultural and personal beliefs. Toyota describes respect as follows: “through respect, we accept personal responsibility for what we do and build understanding with those around us” [35]. More precisely, Toyota demonstrates and promotes respect by treating employees fairly and by providing them with continuous training to improve their skills and knowledge, and thus grow to their fullest potential [8,36]. Respect for employees at Toyota also means listening to and considering their opinions, valuing their abilities and qualities, and providing them with clear objectives to facilitate the achievement of their tasks [1,37]. According to Toyota managers, important and true respect is shown through the problem-solving process [38]. Through this process, supervisors and employees collaborate to identify the root causes of a problem and determine the optimal solution to eliminate it. Nevertheless, supervisors are not close enough to the problem to know all the facts and often rely on employees and their proficiency to find the best solution. This approach is considered as the highest form of respect because it demonstrates the value and importance placed by the company on the employees’ knowledge and role [38]. On the other hand, there are two major elements that are seen as disrespectful in the context of LP and should be avoided: (1) treating employees as if they are wasting their time, and (2) ignoring their contributions [1,39]. Respect is, therefore, a pivotal feature of LP philosophy [40];
 4. **Empowerment:** Toyota takes employee empowerment very seriously, recognizing that this practice leads workers to reach their full potential, and thus make the greatest contribution possible [1,41]. Empowering employees consists in delegating certain functions and tasks to them and giving them the autonomy they need to do their job [42]. For example, they are usually asked to eliminate waste, solve work-related problems, prevent new problems from occurring, and enhance productivity, among others [43,44]. In other words, they are asked to be proactive and find ways to improve the company instead of waiting for the manager to direct them all the time [8]. Empowerment is important because it promotes ideas, creativity, and innovations in the workplace [45]. Another example of empowerment at Toyota is that employees can stop the production line in the event of a problem so that defects are not included in the final product [16,36]. For this purpose, the role of the supervisors is twofold: (1) they should teach employees to stop the line when a defect occurs and (2) they should involve employees in discovering and correcting the root cause of the defect. In this way, any worker can stop the line at the right time, whenever necessary [46]. Overall, at Toyota, employees are not only empowered to find ways to improve the organization, but they are also provided the framework and coaching to be successful at it;
 5. **Job security:** Toyota is dedicated to ensuring the long-term job security of its employees: “when you work for Toyota, you have job security” [1]. Its HR department plays a major part in ensuring job security through its advanced methods that allow for hiring the right employees and forecasting workforce needs [8]. Companies usually hire employees to fill an immediate need, which may be considered as a successful short-term strategy. Toyota’s method, however, seeks to align the competencies needed by the organization with those of the candidate (i.e., abilities and skills). This allows the company to successfully meet both the immediate need and the characteristics required to move employees into new roles and positions, thereby ensuring long-term job security [8]. Toyota management believes that good results are associated with employment security and considers this security alleviates employee concerns about

- the company's transformation and generates a strong workforce commitment that drives them to be involved in LP [47–49];
6. Recognition: This practice is crucially important in boosting morale and creating goodwill between employees and managers [50]. In that sense, Toyota takes great interest in reward/recognition programs to ensure that its employees remain loyal to the organization and aligned with its goals. At Toyota, recognition/rewards are not individual as they are in most companies, but rather group-based, seeking to build team spirit [51,52]. Moreover, rewards tend to be increasingly process-oriented rather than results-oriented, and include small funds for team activities, group performance bonuses and quality circle awards [8]. Even though rewards for creative ideas, suggestions, or opinions may, in most cases, be symbolic, they are needed to motivate employees to continuously make improvements in their workplace [1,43];
 7. Supervisor/manager support: One of the reasons LP works at Toyota is that all members support each other [51,53]. Employees working in teams support each other in accomplishing common tasks, and management supports these teams by providing them with the necessary resources (e.g., time and materials) to actively achieve their objectives [54]. Toyota promotes teamwork, particularly in problem-solving because it believes that teams have better insights into the cause of the problem and can come up with effective solutions and improvement suggestions. Here, the supervisor's role is to provide support to solve the problem and encourage cooperation among team members [8,36]. In this regard, Toyota elaborated several strategies to support teamwork, among which we find: cross-functional work teams, where employees with different functional expertise work together to achieve a common goal, and the team action plan which assigns specific instructions to each team member to perform tasks efficiently [1,8,55]. In reference to Toyota, Liker [1] pointed out that management takes seriously its responsibility to effectively support employees and help them get involved in the change;
 8. Fairness: Fairness at work is among the factors that allow Toyota to succeed [56,57]. Its LP culture based on equal and fair treatment pushes supervisors/managers to treat everyone fairly at all times and under all circumstances [58,59]. Fairness at Toyota encompasses multiple aspects (e.g., compensation, working conditions and environment, equipment and materials, and personal treatment) and is demonstrated in several ways. For instance, employees cannot be promoted or receive pay raises without HR approval because Toyota believes that if employee compensation and promotion are determined solely by the supervisor, individuals may have difficulty understanding and trusting the company's promotion policy, which may affect their sense of belonging [8]. Moreover, dissimilar from most companies where HR personnel spend most of their time in front of a computer screen, at Toyota, HR staff also make visits to different departments to verify that everyone is treated fairly on the job and works under the right conditions [8,36]. Toyota's approach is to create human resource systems and policies that enforce fairness in the workplace in order to incentivize employees to not only identify problems but also take responsibility to solve them [36]. In such a fair work environment, employees tend to be more responsive and more involved within the company [36,60];
 9. Occupational health and safety (OHS): Toyota managers place a high priority on employees' health and safety [8,55,61]. They promote preventive safety measures, safety awareness and ergonomic awareness to alert employees of abnormalities with potential health and safety consequences [8]. They also implemented various formal mechanisms, such as health and safety committees that respond on the same day when a health or safety issue occurs [8]. Moreover, at Toyota, safety meetings between employees and their supervisors are scheduled on a daily basis at the beginning of the shift. These group meetings last five minutes, a period during which the production line is stopped in order to communicate safety information and discuss work-related

hazards [8,62]. The purpose is, on the one hand, to keep all employees focused on safety, and on the other hand to allow group leaders to find out if there are any issues or concerns to report on the company dashboard. The information listed in this dashboard is reviewed monthly during each department's safety meeting and then shared with all department managers. This approach serves to hold managers and group leaders accountable [8]. Toyota makes major efforts to ensure that employees are physically safe and mentally healthy in their workplaces so that they can be involved in making improvements [47]. The focus of Toyota on occupational safety and health stems from the fact that, without it, employees cannot be truly committed and involved in the LP project [1].

Many of Toyota's HRM practices are adopted and implemented by companies in many other industries including the ceramic tile industry [19], aerospace industry [6], construction firms [2], and electronics manufacturing [54]. Training in particular is a practice that is found in the majority of the sectors of activity since it is paramount for understanding the objective and the necessity of the LP implementation.

4. Research Methodology

4.1. Research Design

This study aims to explore which of Toyota's HRM practices are used in a large company of the aerospace sector and how they are implemented. For this purpose, we used the qualitative method of research. A primary advantage of using a qualitative approach is to explore understudied research topics and gain a deeper understanding of people's experiences, intentions, perceptions, and attitudes [63], which is in alignment with the objectives of this study.

Data were collected in January 2020 using individual semi-structured interviews with 30 employees (15 production and 15 office workers) working in a Canadian aerospace company specialized in designing and manufacturing business jets. The company has several sites in Canada and abroad, with a workforce of over 13,000 employees. Of our 30 participants, seven were females and twenty-three were males. Their age ranged from 26 to 58 years, and their working experience ranged from 2 to 30 years.

Each interview was conducted face-to-face and lasted approximately 60 min. All of the interviews were recorded with the participant's permission and transcribed immediately afterward. Transcripts were designated by alphanumeric codes, which we assigned to participants in order to preserve their anonymity. These codes, ranging from E1 to E30, were distributed following the chronological order of the interviews, with code E1/E30 referring to the first/last performed interview.

To build the interview guide, a list of questions was developed based on the literature on LP. This procedure is used by researchers who draw on the content analysis method [64]. We used a funnel interview method, starting by posing general open-ended questions to end up with more specific and closed questions [64]. We started the interviews by asking general and open-ended questions with the purpose of gathering as much information as possible about our research topic. These questions included, for example: How would you describe the LP project that you are experiencing in the organization? What were the management practices that fostered your commitment to LP? What practices does your supervisor adopt to enhance and/or maintain this commitment? These were then followed with more specific questions about HRM practices, including questions about Toyota's HRM practices (see the previous section) to find out if these practices match those of the company under study and to assess the differences and similarities in their implementation. Furthermore, as recommended by Hermanowicz [65], we concluded the interviews by offering our participants the opportunity to add information about aspects not covered, and to give their opinion on the interview and the topic at large. This approach gives participants the freedom to share additional information or issues that may be valuable for the research [65]. Finally, the questions included in the interview guide were pre-tested with employees of the company where we carried out the interviews and readjusted to

ensure that the questions were clear to our participants, well-sequenced and organized, and encourage them to open up [65].

For more details on the research method, see Appendix A. Figure A1 illustrates the six steps followed in the research method, and Table A1 provides a description of each of these steps.

4.2. Data Analysis

Data analysis followed the three coding techniques proposed by Strauss and Corbin [66] as illustrated in Figure 1.

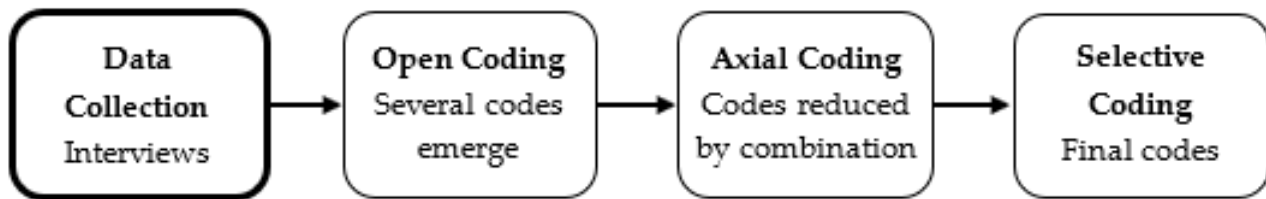


Figure 1. Overview of the coding process. (Reprinted with permission from Reference [67]: Copyright 2017, SAGE Publications).

After gathering data through interviews, we proceeded to the data analysis, starting with open coding. With open coding, data were analyzed, conceptualized, and categorized. The objective of this stage is to identify the central idea of each segment of a sentence or paragraph and develop a code to describe it. Several codes referring to HRM practices implemented in the organization under study were generated (e.g., communication, information exchange, training, and recognition). In the next step, axial coding was used to assess the relationships between the different codes identified in the open coding level. In the axial coding, codes with similar meanings were combined and grouped (e.g., communication-information exchange). At last, selective coding was conducted to determine the core and final codes related to the purpose of the present study.

5. Research Findings

As a result of the qualitative analysis, we identified several HRM practices implemented in the aerospace company under study. Below, we list each of these practices and describe their implementation.

1. **Training:** Respondents reported that they had attended several forms of training within the company, including (1) classroom-based training, which is typically designed for a small group of employees and often focuses on developing basic knowledge and skills, (2) experiential learning, where employees learn by doing the tasks, and (3) individual training, designed to develop a specific skill or behavior related to the employee's work. According to our participants, many of the trainings they received were related to health and safety, quality, technical aspects, and to the LP project in general. It is important to note here that we found some differences between the trainings received by office and production workers. Production employees attended a variety of trainings that aim to facilitate their understanding of the LP philosophy, including lectures, demonstration videos, hands-on activities, and case studies. As in Toyota, employees confirmed that they are applying the concepts learned in the workplace: "during the training sessions, you consider what you are actually doing on the shop floor [...] after those trainings, you put the knowledge into practice". On the other hand, office employees received less training on LP: "there is not a lot of training or understanding on LP," resulting in poor comprehension of the purpose of the LP project. Some of them believed that LP tools need to be further explained by referring in particular to the dashboard: "we should understand what exactly is the dashboard and why we need it, so that, at the meetings, we will not

be mere spectators, we will be able to participate in filling it out and continuously improving it," "we received courses about LP, and our manager asked questions about what is LP and how to fill in the LP dashboard, [...] but I still think that this is not well communicated or explained". Although the components of the dashboard (health and safety, quality, productivity, human development, and costs) are discussed during the team meetings, its objectives and related key performance indicators are not fully explained to all office employees. Only a small number of employees from each team is selected by the company to receive appropriate training on the dashboard in order to be able to manage, monitor, and update it. Another reason why office employees tend to have difficulties understanding LP is that, although they are trained on some of its tools (e.g., 5S is a system to reduce waste and optimize productivity through maintaining a clean and orderly workplace [1], and standardized work is a process for documenting the steps of a job task and the sequence in which those must be completed [8]); these learnings are usually not applied in practice due to reasons such as non-prioritization of these tools in the execution of their tasks, lack of awareness of the use of these tools, and lack of follow-up by supervisors and management: "the tools we learned often do not become our priorities and are put aside due to lack of time, lack of resources, lack of all sorts of things," "there are tools to improve the workplace, but there is no follow-up or involvement from the company";

2. **Communication:** Interviewees indicated the existence of good internal communication within the company, with a difference in its implementation among office and production employees. Office employees reported that they should attend daily morning meetings to exchange information with their colleagues and supervisor, and discuss work-related issues: "during the meetings, we review all the problems and situations we face during the day". During these meetings, employees may request assistance with their workload and ask for information that may help them complete their tasks on time, thus avoiding waste of time and resources. Moreover, office employees stated that the feedback received from their supervisors was useful for achieving their tasks. Other than in meetings, however, this feedback was not always immediate since it took place mostly over email. In contrast, production employees were not required to attend morning meetings, as communication among co-workers or with the supervisor typically occurred face-to-face on the shop floor to address work-related issues or improve the performance of their work duties. Moreover, they stated that they can easily communicate with their supervisors at any time if they need clarification or assistance in the accomplishment of their work: "our manager listens to our concerns and understands our issues," "supervisors often understand everything we say because they are with us on the shop floor; we talk to them when we have a problem, and they help us with our work". Production employees considered that the information communicated by their supervisor was valuable and useful because it allowed the production cycle to run smoothly and effectively;
3. **Respect:** Several interviewees reported feeling respected in the workplace, and most of them never experienced any problems in this regard. Although there may be differences of opinion regarding a particular issue or way of working, respondents revealed that, ultimately, everyone respects each other: "I think that respect is there all the time," "we can't agree on everything, there are different points of view, but in the end, we all respect each other's points of view, and we all respect each other". Respect is demonstrated by professional behaviors such as not talking down to employees, being understanding, listening to their opinions, and considering their ideas. For instance, when a complicated issue arises, whether for office or production employees, supervisors often interact with them to get their input and work out a solution together. Moreover, when an employee makes an error or oversight (e.g., failing to complete an urgent task on time, missing an important meeting, or not communicating critical information on schedule), the reaction of supervisors is professional and polite (e.g., using appropriate language and the correct tone of voice), focusing on

- understanding the reasons to quickly address the problem. Finally, interviewees indicated that respect should be mutual to create a positive atmosphere at work, and hence enhance the performance and productivity of all organization members;
4. Supervisor/manager support: All interviewees recognized that they were supported in accomplishing their work in meaningful ways: “we are supported by our management [...] this helps us to do our work and perform better”. Respondents indicated that the support of their managers/supervisors can be presented in different forms, either by providing them with the tools they need to carry out their tasks correctly, by advising and guiding them, or by referring them to the right persons who can help with their issues. They furthermore stated that seeing their supervisors do their best to support them increases their willingness to address ongoing issues. Mutual support between co-workers was also pointed out by the interviewees who underlined that the company fosters this way of working to consolidate relationships in the workplace and thus achieve maximum efficiency. Regarding the worker category, production employees work as a team and cooperate with each other to solve problems and get the job completed in time. New hires or less experienced employees often seek help and guidance on complex tasks from more senior team members: “if I have a work problem, I will go to the more experienced co-workers and ask if they did that task before, how exactly they did it; I will ask for help”. Moreover, production employees reported that their supervisor was usually present on the shop floor to monitor the progress of their tasks, observe how they carry out their work, and assist them when necessary. The supervisor ensures that employees have the necessary tools, products, and parts to complete their job. Office employees also frequently work in teams. The latter stated that technical support comes more frequently from their peers than from their supervisors: “I will go and ask for support from my co-workers, I will not go to my supervisor all the time”. However, they also relied on their supervisor when it comes to coordinating work and escalating issues that require higher-level support;
 5. Fairness: According to our participants, employees are all equally treated: “we are all treated the same way,” “all people are equal, and all people are subject to the same rules”. One of the processes that the company under study implemented to ensure fairness in the workplace was the performance management process (PMP). PMP is a process by which supervisors and employees meet annually to evaluate employees’ performance and discuss their accomplishments and overall contribution to the organization. Following these meetings, employees are asked to perform a self-evaluation rating, which is then reviewed by the HR department and management to fairly determine salary increases. Another way fairness is put in place by the company is by providing employees at a similar job level with the same benefits and resources, including equipment, physical workspace, and working conditions. Interviewees stated that their company promotes fairness to avoid conflicts and tensions in the workplace. In other words, if employees perceive that management favors one worker over another, non-cooperative behaviors may emerge, and employees’ continuous improvement initiatives and efforts may be reduced;
 6. Occupational health and safety (OHS): Our participants perceived that their company is concerned with occupational health and safety issues and is well-equipped to provide a safe workplace: “the company takes employee health and safety seriously,” “we see that health and safety is an important aspect of our company, and that many actions are taken in this area”. Respondents articulated that the establishment of OHS within the company is reflected in several ways. For example, OHS is the first item presented in the dashboard and the first point addressed in group meetings. Two major questions are asked at the meetings regarding this item. The first question is: “did you observe any safety issues or unsafe acts?” When there is a report about an OHS-related concern (e.g., not enough fire extinguishers available, presence of chemicals or other hazardous materials in the office, expired items in the first aid kit), the staff responsible for the dashboard informs the health and safety committee to

take the necessary actions. The objective of this question is to involve employees in OHS and raise their awareness. The second question (i.e., “did an incident or accident occur the previous day?”) is used to keep a record of incidents and accidents. Each time an employee reports an accident/incident, the dashboard is updated accordingly. The supervisor uses this information to prepare monthly reports for the health and safety committee. This allows the company to monitor the number of incidents and accidents occurring on a monthly basis, determine if there were improvements or not in the OHS aspect, and take more corrective actions when there is an increasing trend. Given that production employees are exposed to more potential hazards than office employees, they do not have to wait for meetings to report an OHS issue but can inform their supervisor immediately upon its occurrence in order to be addressed in the shortest time possible: “when we flag issues regarding OHS, our supervisors listen to us and often fix them right away; there are no delays with safety”. Finally, both employee categories reported that there are extensive actions and discussions about health and safety within the company to sensitize and render everyone more responsible: “there is a lot of discussion about health and safety, a lot,” “the majority of the emails we receive from the company refer to health and safety”.

In comparison with Toyota, although there were some differences, the aerospace company under study implemented several of the HRM practices recommended by Toyota. Table 1 provides a compilation of HRM practices used by the two companies in question.

Table 1. Comparative table of HRM practices.

Toyota	Aerospace Company
Training	Training
Communication	Communication
Respect	Respect
Supervisor/manager support	Supervisor/manager support
Fairness	Fairness
Occupational health and safety	Occupational health and safety
Job security	
Empowerment	
Recognition	

6. Discussion

Companies seeking to implement LP try to adopt the same methods and practices used by Toyota to achieve organizational performance and success [46,54,68]. In this study, we set out to determine what are the HRM practices that were adopted by a large Canadian aerospace company and how they are implemented.

Our findings show that some of Toyota’s management practices also exist in the aerospace company under study but are not all implemented in the same way. This is to be expected because companies should not simply copy LP practices but rather adapt them to their work environment and sector of activity [36,69,70]. According to Toyota, companies can adopt its practices in a way that fits their context, because copying them to the letter will lead to failure [1].

Our results show that employees received different forms of training within the participant company. These trainings were similar to those listed by Toyota, including classroom training, experiential learning, and individual training. While these types of training seem to be diverse and target different objectives, office employees, in particular, reported that they were insufficient to fully understand the purpose of LP. They argued that more education is needed to clearly understand what exactly is expected from them and how to master LP tools and methods. Several authors emphasized the need to educate employees on the “why” and “how” of the LP implementation to encourage their involvement (e.g., [71–73]).

Beyond theory-based trainings, an important form of training underscored in this context by both office and production employees is experiential learning. This form

of training is highly recommended by Toyota, especially in the early stages of the LP transformation, because it allows employees to experience and actually understand the tools they learned in the classroom. In the implementation of experiential learning, however, the company under study seemed to face challenges related to the translation of learnings into practice and the lack of follow-up from management.

Communication was recognized by the interviewees as an important practice in the workplace. Although Toyota proposed several internal communication methods (e.g., instant messaging, meetings, and bulletin boards) that can be useful in the context of LP [8], in our study we found that office employees relied, to a great extent, on regular meetings to exchange information and address work-related issues. On the other hand, production employees mainly relied on face-to-face communication on the shop floor, a communication method strongly advised by Toyota. Typically, supervisors listen to employees to ensure they understand the information provided and to gain more insight into their problems and suggestions [74,75]. Building two-way communication is necessary to improve understanding of the company's goals and objectives so that employees can easily get involved [75]. In alignment with Toyota, interviewees confirmed that their supervisors were generally good listeners and could readily communicate with them whenever needed. One important caveat is that except for team meetings, communication between office employees and their supervisors primarily took place over email, which may delay information exchange and downstream processes.

Interviewees also emphasized the importance of respect in the workplace. In accordance with Toyota's view that respect is the foundation of relationships, participants acknowledged that their company strives to ensure a respectful environment. They further claimed to have never felt disrespected by their supervisors or colleagues. One of the reasons is that when disagreements arise between team members or with the supervisor regarding particular work issues, these take place in a constructive and healthy atmosphere. Furthermore, according to our participants, the company takes great concern in providing a culture in which employees' opinions and ideas are valued and welcomed.

Overall, respect allows team members to work well together to accomplish the desired goals [76], which is necessary in the context of LP.

Supervisor/manager support is another practice that interviewees considered of the most interest in the LP context. According to our interviews, we found that the company under study follows Toyota's approach of fostering teamwork. Participants considered that their company encourages them to work as a team and mutually support each other to attain a common goal. Mutual support usually leads to better job performance and facilitates the accomplishment of the company's objectives [77,78]. Moreover, interviewees emphasized that the support received from their supervisor/manager was key to their work performance. For production workers, particularly, supervisors were frequently present on the shop floor to provide immediate support. Supervisor/manager support is one of the main facilitators of the continuous improvement process [79]. When an organization undergoes changes, support from management and supervisors must be provided to involve employees in the change process and prevent their resistance to the new management approach [80].

Furthermore, interviewees highlighted the importance their company places on fairness at work. Similarly to Toyota, the company under study promotes fairness to encourage employee cooperative behaviors and boost their work effectiveness. Interviewees highlighted that their company strives to build a culture in which all employees are governed by the same rules and employees in similar positions receive the same benefits and resources. Fairness is a major factor in the context of LP, as employees can only make continuous and sustainable improvements if they feel treated fairly [24,81,82]. Fair treatment in the workplace contributes to employees' identification with the organization's culture and has been proven to have a direct effect on employees' involvement and commitment to the company [83,84].

Lastly, occupational health and safety was also deemed by our participants to be an important HRM practice. The implementation of occupational health and safety is broadly identical in both companies as both place a high priority on this practice by undertaking different actions to raise employee awareness and address health and safety issues in a timely manner. However, a peculiarity of the company under study is that, in addition to safety meetings, employees engage in broad discussions about health and safety on a daily basis. Moreover, this practice is the first item discussed during team meetings to assess the frequency of work-related accidents and prevent future incidents. The focus of both companies on employee safety and health is based on the realization that employees can only be committed and involved in LP initiatives if they work in a safe environment. Studies (e.g., [85–87]) underscored the impossibility to achieve a successful continuous improvement program without ensuring safety in the workplace. This is because injuries and their outcomes lead to major waste (e.g., time lost due to employee absence and workers' compensation cost), which runs counter to the LP philosophy.

Overall, although some of the aforementioned practices were implemented differently than at Toyota (e.g., communication relied mainly on meetings, and trainings do not cover sufficiently LP tools and methods, and its objectives), they are all part of Toyota's HRM system and are necessary in the context of LP. A promising line for future work is to thoroughly examine the implementation of these practices to determine if they are applicable to aerospace companies of different sizes and to assess the manner in which they are implemented.

In our work, we found that some of Toyota's HRM practices were not implemented by the company under study (i.e., job security, empowerment, and recognition). Job security is often difficult to establish in the aerospace industry due to the cyclical nature of this sector [88–90]. This can negatively affect the successful and sustainable transition to LP, as job insecurity forces employees into a short-term mindset that is hardly compatible with the more long-term horizon and thinking associated with a successful LP implementation [91,92]. Moreover, job insecurity leads to employee instability and insecurity, which often leads them to look for another job, preventing them from being fully committed to the company's continuous improvement process [24]. Regarding empowerment, we found no measures set in place by the company to strengthen this practice. In this direction, some studies concluded that employee empowerment is preferable but is not a necessary condition for achieving a successful LP implementation [93,94]. Lastly, recognition is another practice that was not found among those established by the company under study. Interviewees did not consider recognition to be a necessary aspect for their commitment to LP. They indicated that the omission of recognition does not affect their involvement, i.e., even if the supervisor does not recognize their work, it does not prevent them from being involved and committed to the continuous improvement process. While some researchers consider recognition as important for boosting workforce commitment to LP (e.g., [1,43,95,96]), others are in alignment with our findings, arguing that recognition does not affect employee commitment nor the successful implementation of LP (e.g., [97–99]).

Although Toyota values these three practices (i.e., job security, empowerment, and recognition), it recommends that managers willing to implement LP not use all of its practices, but to choose those that meet the needs of their company and adapt them to its context if necessary. Nonetheless, to gain a better understanding of why these three practices are not being considered and to deeply examine whether they are necessary for aerospace companies, further research is needed.

6.1. Contributions

Our study is among the few to focus on HRM practices in the context of LP, particularly in the aerospace industry. Our findings provide a list of LP-related management practices that can assist managers operating in the aerospace sector to understand the relevance of these practices in supporting the successful transition and sustainability of LP within their companies. More importantly, our work provides a concise depiction of how these practices

are implemented in a large Canadian company in the aerospace sector. Furthermore, given the lack of studies examining the relationship between management practices and LP [19,100,101], researchers can build on our findings to conduct further investigations and expand the body of knowledge on this subject.

6.2. Limitations

We admit some limitations in this study. Our qualitative study is based on a small sample size which reduces the possibility of generalizing the results. A mixed methodology study combining qualitative and quantitative approaches is recommended to overcome this limitation. Moreover, our data were collected from a single company and our findings may not reflect the whole set of HRM management practices implemented in the entire aerospace industry. A study including multiple companies across different countries might provide a better picture of the whole sector. Nonetheless, it should be noted that our interviews were conducted in one of the largest sites of the company in Canada. Moreover, the main objective of our study was not to generalize the results but rather to explore the implementation of Toyota's HRM practices by a company in the aerospace sector.

7. Conclusions

In this work, we investigated the adoption of Toyota's HRM practices by a large Canadian company in the aerospace sector. Regarding our first research objective, our findings show that, in its transition to LP, some of Toyota's HRM practices were implemented by this company, suggesting the relevance of the social dimension in LP transformation. There was, however, no complete overlap with the practices recommended by Toyota, with some HRM practices not adopted at all. In addressing the second research objective, we found that, among the adopted practices, some were implemented differently, which may be explained by the differences between sectors (i.e., automotive vs. aerospace).

Overall, our findings reveal the importance of HRM practices in the aerospace sector and, at the same time, highlight the flexibility and adaptation required in the implementation of these practices across different industries. These findings are consistent with the existing literature, and particularly with the study by Martínez-Jurado et al. [6], which highlighted the importance of HRM practices during the Lean transition. Their findings also showed that some of Toyota's HRM practices (e.g., training, rewards, communication) were adopted in the aerospace sector, and underscored the flexibility in their implementation.

The generalizability of our study is limited due to the small sample size (30 participants). However, the research findings are relevant as they can help practitioners understand the importance of HRM practices when adopting LP and the way these practices can be implemented in their specific sectors of activity.

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Appendix A

Description of the research method used in this study.

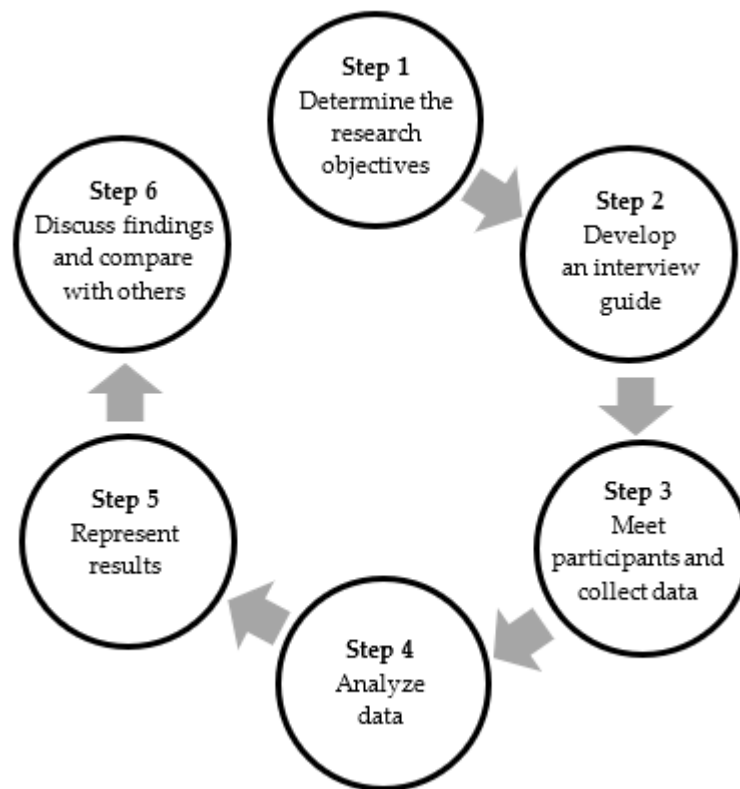


Figure A1. The main steps of the research method followed in our study. (Reprinted with permission from Reference [67]: Copyright 2017, SAGE Publications).

The overall research method included six main steps, as described in the table below:

Table A1. Description of the steps of the research method.

<p>Step 1 Determine the research objectives</p>	<p>Toyota's HRM practices were conceived in the automotive industry. The adoption of these practices may therefore require some tweaking when the target company is from a different industry. In this work, we set to investigate the implementation of Toyota's HRM practices in one of the largest aerospace companies in Canada. The objective of our research is twofold: Identify which of Toyota's HRM practices are adopted by the target company Explore how these HRM practices are implemented</p>
<p>Step 2 Develop an interview guide</p>	<p>In addressing our research objectives, we conducted semi-structured interviews with 30 employees from the target company. For this purpose, we developed an interview guide to explore the implementation of Toyota's HRM practices. The interview guide helped us direct the conversation and focus on the topics we want to discuss. The guide included two types of questions: General and open-ended questions to gather maximum data about our research topic (e.g., How would you describe the LP project that you are experiencing in the organization? What were the management practices that fostered your commitment to LP? What practices does your supervisor adopt to enhance and/or maintain this commitment?) Specific questions about HRM practices (e.g., Do you receive training within the company? What kind of trainings do you receive? How are these trainings implemented by the company? Could you give some examples of real-life situations within the organization?) Before starting the interviews, we pre-tested our interview guide with employees of the company where we conducted the interviews and readjusted it to ensure that the questions were clear to our participants.</p>
<p>Step 3 Meet participants and collect data</p>	<p>Interviews were conducted face-to-face, were recorded, and lasted approximately 1 h. Before the questions were asked, we explained to the interviewees the purpose of our research. We also gave a brief introduction to the Lean Production system to make sure that respondents knew what the LP was. We asked participants for their permission to record their responses and explained the reasons for the recording. The interviews did not begin until a consent form approved by the ethics committee of Polytechnique Montréal had been signed by the participants. Then, we proceeded to ask the questions included in our interview guide, starting with general and open-ended questions to progressively ask more specific questions about the implementation details of HRM practices. We ended our interviews by asking participants if they wanted to add any information or aspects that were not discussed. Finally, we thanked each participant for their time and the information they provided.</p>
<p>Step 4 Analyze data</p>	<p>After gathering the data from the interviews, data analysis consisted of the following steps: We transcribed each interview in its entirety by repeatedly listening to the audio recordings. Each transcript was then used to identify the information relevant to our research objectives and discard the rest (e.g., content that is out of context). We organized and structured the collected information using the three coding techniques proposed by Strauss and Corbin [66]. With open coding, we broke down the data into discrete parts and created codes to label them (examples of emerged codes referring to HRM practices: communication, information exchange, training, professional support, personal support, and fairness). With axial coding, we combined codes with similar meaning (e.g., communication-information exchange). Lastly, we used selective coding to determine the final codes related to our research topic.</p>

Table A1. Cont.

<p>Step 5 Represent results</p>	<p>The data analysis step produced several HRM practices We found six of Toyota's HRM practices adopted by the company under study, namely: training, communication, respect, supervisor/manager support, fairness, and occupational health and safety. For each one of these HRM practices, we described the strategies used for its implementation in the target company. For more details on how these practices are implemented, please see Section 5.</p>
<p>Step 6 Discuss findings and compare with others</p>	<p>Finally, we discussed our findings, provided explanations as to why some of Toyota's HRM practices were adopted by the target company while others were not, and assessed the implementations of adopted practices, comparing their implementation details with those proposed by Toyota and considered potential reasons behind the different implementations. We furthermore argued the implications of our findings in this aerospace company with respect to the whole industry and compared them with other works. Briefly: In response to our first research objective, our results showed that not all Toyota's HRM practices were adopted by the company under study. In response to our second research objective, we found that some of the adopted practices were not implemented in the same way as Toyota. Our findings are consistent with prior work studying LP in the aerospace industry (Martínez-Jurado et al. [6]), which highlighted the fact that the aerospace industry adopts some of Toyota's HRM practices (e.g., training, communication) although there are differences in their implementation; we went a step further and documented a number of these differences.</p>

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