From Product to Service Ramp-Up Management

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Abstract.
Ramp-up often requires the implementation of a new production system and some adaptations for the entire supply chain. It is also a major issue for service companies in both secondary and tertiary sectors. Although some of these companies are not confronted with the management of a new production system, they also have to face many difficulties during ramp-up. These difficulties are amplified by the growing uncertainties on the markets and the volatility of the customer demand. The current paper sheds light on common and diverging aspects of product and service ramp-ups as well as on solution approaches for service ramp-up management. As such, current research provides foundation for future research dealing specifically with service ramp-up.

Keywords: Ramp-up, service, stakeholders, collaboration, agility, project.

1   Introduction

Ramp-up is a challenging phase in product and service life cycles. It corresponds to the period when companies progressively deploy their new products or their new services to their customers. Numerous articles in the literature have studied ramp-up, but most of them have focused on companies in the secondary sector [1-3]. Indeed, ramp-up is extremely important for manufacturing companies, and often requires the implementation of a new production system and some adaptations for the entire supply chain. Ramp-up is also a major issue for service companies in both secondary and tertiary sectors. Although some of these companies are not confronted with the management of a new production system, they also have to face many difficulties during ramp-up which are amplified by the growing uncertainties on the markets and the volatility of the customer demand [4].

The current study contributes to building knowledge about service ramp-up by exploring related research works and by identifying common and diverging aspects of product and service ramp-up as well as solution approaches to deal with service ramp-up. The remainder of the paper is organized as follows; section 2 provides a background on the topic. Section 3 briefly reports on the research method. Sections 4 and 5 report respectively on common and diverging aspects of product and service ramp-up. Section

6 presents solution approaches for service ramp-up. The paper ends with concluding remarks in section 7.

2 Background

Companies are increasingly confronted with issues during ramp-up of products and services, which is partly due to growing market pressure [5]. For manufacturing companies, Bergs et al. [6] underline that product lifetime tends to decrease with a more rapid evolution of customer requirements. This is also true for service companies, as Akkermans et al. [5] explain in their research about ramp-up and ramp-down dynamics. Indeed, it is shown that market pressures lead to accelerate the design of new services and their deployment. Among the other causes explaining the growing importance of service ramp-up, Akkermans et al. [5] argue that digitalization is progressing in different sectors, such as banking, media, or insurance. This development entails profound changes in the service offer of companies, and notably requires some improvements or adjustments. This compels many companies to carefully address service ramp-up phase. The progress of servitization also contributes to explaining the recent emergence of service ramp-up, in particular for industrial companies. For these cases, service ramp-up is often a more crucial issue since these companies are not necessarily used to propose services [7].

According to Akkermans et al. [5], service ramp-up is defined as a "process of rapidly increasing the delivery of a service to meet the demand". However, ramp-up leads usually to many problems about delivering newly designed services. For instance, companies need to deal with the satisfaction of customer demands and internal upheavals due to process changes and increase in capacity. These two main issues often have opposing goals, so that reconciling them is not an easy task for companies [5]. Ramp-up is particularly crucial since it highly impacts the deployment of a new service, and it partly conditions the success of the new service. Akkermans et al. [5] report that the ramp-up difficulties are actually one of the main reasons that can explain the failure of a new product or a new service deployed by companies. A service ramp-up entails changes in the supply chain and in process. In a ramp-up context, difficulties are inevitable: many experts notice that problems are inherent to ramp-up. Backlogs, high costs or lack of resources are regarded as the main problems encountered by companies [5].

3 Method

In order to investigate the scientific literature and address the research problem, a three-step method is used (see Figure 1). First step aims to collect articles about service ramp-up including case studies and applications of ramp-up in manufacturing and service sectors. Main used keywords are "service ramp-up", "service supply chain", "new service development", "demand", and "change management". Additional keywords were used to expand the research such as "ramp-up", "learning curve", "new product development", and "production planning". Second step consists of selecting and classifying

the most relevant studies using the following criteria: context and nature of the phenomenon studied, research method used (e.g. survey, simulation, etc.), scope (e.g. large scale, medium scale, case study), and key performance indicators (KPI). This step is not described in this paper because of page limit. The third step consists of a comparative analysis of product and service ramp-ups (sections 4 and 5) based on the selected articles. A focus is put on service ramp-up management by exploring main solution approaches to deal with its underlying challenges (section 6).
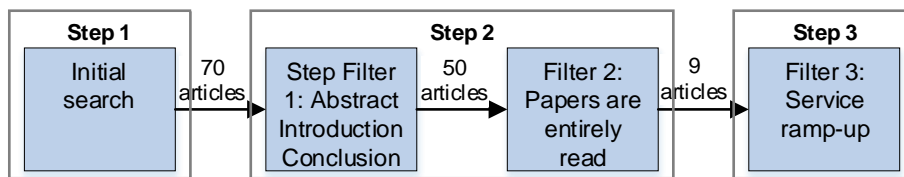

Figure 1. Paper selection process

4   Converging aspects of product and service ramp-up

4.1   Context

Product ramp-up and service ramp-up share common aspects related to ramp-up context. Akkermans et al. [8] highlight that the novelty of the product or of the service requires an increase in supply chain resources and capacities. The ramp-up in both contexts also creates impacts on the entire supply chain (e.g. involvement of all the supply chain actors). Besides, the context in which the ramp-up takes place is dynamic, whether it is for product or for service. This uncertain context explains the need of flexibility for companies dealing with ramp-up [9].

4.2   Challenges

Similarly to product ramp-up, Akkermans et al. [5] identified several issues faced by companies delivering services, namely time issues (observation of deadlines and backlog risk), quality issues (ensuring an acceptable level of quality for newly developed services), volume issues (managing deployment capacity), cost issues (avoiding overruns and financial losses). Several studies addressed the same issues in product domain [10-12]. Both service and product companies are confronted with change management during ramp-up. Indeed, they need to face a moving situation, as process have to change and operators have to address these changes [5,12], which requires in turn a suitable strategy for change management.

4.3   Learning

Scientific literature puts forth the importance of learning during the ramp-up for product and service domains alike. This phase is devoted in both cases to the acquisition of knowledge about the new offer proposed by companies and the process necessary to deliver it. Akkermans et al. [5, 8, 13] investigate three different case studies in the telecommunication sector and argue that learning is a key in service ramp-up. Bergs et al. [14] explain that acquiring knowledge is a crucial process during ramp-up. von Cube and Schmitt [15] underline the importance of knowledge management. Several experts argue that ramp-up requires an important preparation, and this is often done by giving some time for operators testing and experimentation [16-18]. In these different studies, it has been clearly indicated that the ramp-up curve, which represents the progress of the ramp-up over time, is closely related to the learning ability of the operators, as well as their attitude towards change and their capacity to adapt.

5   Diverging Aspects of Product and Service Ramp-up

5.1   Speed

One of the most striking differences between service and product ramp-ups is the speed at which ramp-up can be carried out. As Akkermans et al. [5] explain, ramp-up can be quicker in the case of services compared to product context. Indeed, product ramp-up is often a quite long process which stretches over several months at least. Most of the time, this important duration can be explained by the deep changes entailed by the ramp-up of production lines as well as operators. These deep changes can notably affect process and methods followed or the equipment used.

On the contrary, lead times may be particularly short for services, and more specifically for IT services. These short lead times explain that service ramp-up can be conducted very fast. Therefore ramp-up curve is often much steeper during service ramp-up [5, 12]. The authors clearly highlight that a too fast ramp-up is very risky for companies so that a violent ramp-up is likely to worsen the difficulties encountered by companies, whether it is with their customers, with their suppliers or within their own departments.

5.2   Ramp-up Syndrome

The particularities of service ramp-up entail a specific phenomenon called ramp-up syndrome [8]. This syndrome is characterized by a too fast ramp-up at the beginning which leads many companies to temporarily stop the ramp-up and move to a ramp-down phase. All the more so since numerous companies suffer from the optimism bias. This bias, which is quite widespread, means that companies are overly optimistic about their capacity and their schedules, and entices them to neglect some risks. This too high optimism may also be worsened by a lack of visibility from which many companies

suffer. On the other hand, the lack of mastery of the services delivered also contributes to aggravating the ramp-up syndrome. Indeed, that entails high rework levels for operations and highly affects internal workloads and reaction capacities of companies [8].

5.3   Link with The Customer

As far as services are concerned, production and consumption are simultaneous. This means that the problems faced during service ramp-up are very often visible for customers. Thus, these customers are directly impacted by the difficulties that companies encounter during the ramp-up and suffer from the lack of mastery faced by most companies, which is likely to entail quality problems [5]. Akkermans et al. [8] report that these problems especially affect the digital services. On the contrary, as far as products are concerned, production and consumption do not take place at the same time: most often, they are separated at least by delivery time. The problems faced by industrial companies during product ramp-up may be numerous and difficult to solve, but they have most of the time a rather small impact on the customers. They can only see, most often, longer delays before being delivered. The time interval between the production and the consumption of a product gives in a way an opportunity for industrial companies to identify problems and solve them before they directly impact their customers. That offers also more time for companies to correct mistakes and continue the learning phase. These consequences should not be underestimated, indeed, the customer relationship is an important issue for service companies, and such difficulties for delivering the expected services are likely to deeply deteriorate the relations between the two sides. That represents a cost for companies, in particular for their brand image and their reputation but also for their market value.

6   Solution Approaches to Service Ramp-up Management

6.1   Internal Cooperation Between Marketing and Production

Several articles highlight that one of the main causes of the problems encountered during service ramp-up is related to the lack of information. That also echoes the learning issue, whose importance was underlined in numerous articles related to ramp-up [6], [5] [8]. This problem is partly related to difficulties in sharing the information between companies departments [5]. The importance of coordination between sales and operations has been underlined by setting a multidisciplinary ramp up team including sales, planning, logistics and operations, etc. [5]. The idea of improving cooperation between different departments during ramp-up has been highlighted in several other studies putting the focus on one or several aspects e.g. value chain perspective, customer focus, stakeholders' needs [15]. It is argued that marketing department is focused on sales improvement without necessarily taking into consideration technical and operational issues (they are unware of real production capacities). Similarly, operations department

has difficulties to align with sales needs. Akkermans et al. [5] used several models for showing how these departments could coordinate their activities. The results obtained by simulating these models, showed that coordination between sales and operations reduces negative fallouts entailed by ramp-up (e.g. delays, quality defects, costs…).

6.2 Forecasting

Sperry and Dye [19] considered forecasting issues by investigating a case study about the opening of a new rail station. They have highlighted that the demand ramp-up is a long process (3 years). They argue that forecasts are useful with respect to the passenger profiles change, to secure the project and its financing and to calibrate the ramp-up. However, these forecasts are not sufficient, and it is necessary for companies to collect real data, through frequent traveler surveys.

Forecast quality has also been underlined in another article about toll road [20]. This study shows that most of the current models fail in taking into consideration the effects of the ramp-up, which leads to a global overestimation of the traffic, at least during the first years after the opening of the toll road. The authors highlighted the same phenomenon that Sperry & Dye [19] addressed: there is a ramp-up period after the opening of a new transport infrastructure before it is possible to reach its planned full potential demand. That is mainly due to the time, which is necessary for customers to change their behaviors, as Sperry & Dye explained [19], but the authors also enhanced that some operational teething disturbances, that are quite common for this kind of projects, are likely to penalize the new infrastructure at its opening and contributes to extending the duration of the demand ramp-up. To improve the forecast quality, Dharmawan et al. [20] used a stochastic method, based on Monte-Carlo simulation. That aimed at successfully modeling the demand evolution due to the ramp-up, with the learning phenomenon. Forecasting is also very useful in other service sectors, such as the hotel industry. Enz et al. [21], have underlined that the performance of new hotels which evolves during the ramp-up period can be improved by an adaptation and quality forecasting. More generally, forecasting importance echoes the essential need for companies to anticipate the ramp-up and prepare it.

6.3 Knowledge Management

Knowledge management is regarded as one of the substantial factors for successful ramp-up particularly for service companies [22]. Knowledge and information sharing have a major impact on the speed of adjustments and key decisions in ramp-up [23]. The exploitation of information and a corporate knowledge management can greatly and positively impact on value chain processes efficiency. This can be achieved through an organized coordination and collaborative learning between several stakeholders within and beyond the company, e.g. suppliers, logistic, human resources, process integration and customer [22]. Therefore, collaboration and corporate knowledge transfer among these stakeholders can have significant effects on the ramp-up performance and ramp-up targets. Several solutions based on the knowledge management concept such as Agile knowledge transfer framework [24], Multi-disciplinary Knowledge base [25]

and dynamic management techniques like rolling wave planning [26] can be proposed in order to enhance the effectiveness of a service ramp-up process. Quirchmayr et al. [24] described an agile process to transfer knowledge in the context of software development. This work provided recommendations, especially in relation to human resource management with team building, motivation methods and commitment of the management. Moreover, it has underlined that knowledge transfer is essential and truly complementary to software development.

7   Conclusion

Companies suffer from a lack of knowledge and experience about newly designed services. These deficiencies create a climate of uncertainty and accentuate the different risks that companies are confronted with. Therefore, companies have to develop a know-how about new services particularly during the ramp-up phase. This is likely to support enlightened decisions for ramp-up management. Among these, the following can be cited: identifying the stage of service development at which ramp-up can/should be launched, while balancing uncertainty/risks inherent to ramp-up and the imperative need to deploy the new service; determining the speed at which the ramp-up (which is inherently a gradual process) is conducted, considering company's goals and available/allocated resources. Each of the challenges represents a potential perspective for further investigation in a relatively under-explored field.

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