Feature and Subscription Relevance in Software-as-a-Service Pricing*

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Abstract. Softwares-as-a-Service (SaaS) are gaining prominence due to their availability, scalability, and cost-effectiveness. SaaS make benefits from subscriptions, which consist of pricing plans and add-ons, enabling user-tailored services, which we call subscription configurations. However, as modern SaaS subscription configuration possibilities rise over the thousands, the demand for tools to streamline pricing management becomes more urgent. How can an owner of a SaaS know the best-selling subscription? And how can they know why it may or may not be selling right? This proposal sheds light by providing a mathematical solution that enables understanding of the relevance of features and subscriptions based on the subscription price and percentage of adoption. The outputs are the Feature Relevance Score (FRS) and the Subscription Relevance Score (SRS). These metrics allow SaaS owners to comprehend the performance of the features and subscriptions of their product, aiding in the management of their product's pricing model.

Keywords: saas · software as a service · subscription · feature · pricing · relevance · optimisation · optimization

1 Introduction

The increased adoption of Software-as-a-Service (SaaS) has transformed the way businesses and individuals access software solutions. SaaS offer scalability, reduced expenses, and greater accessibility, making them an attractive alternative to traditional software deployment. Unlike conventional software models that require installation and maintenance on individual devices, SaaS enable users to access applications through the Internet, reducing upfront infrastructure costs and streamlining software updates [5]. One of the most common monetization strategies for SaaS is through pricing plans and add-ons. Pricing plans are defined as tiered subscription models in which users pay according to usage levels, feature access, or resource allocation. In addition to these base pricing plans, providers may offer add-ons that allow customers to customise their subscriptions with

* This publication is part of the R&D projects PID2021-126227NB-C21, and PID2021-126227NB-C22 funded by MCIN/AEI/10.13039/501100011033/FEDER/UE; and part of R&D projects TED2021-131023B-C21 and TED2021-131023B-C22 funded by MICIU/AEI/10.13039/501100011033/European Union NextGenerationEU/PRTR;

additional features or increased usage limits [2]. We define the subscription configuration as the combination of the pricing plan and any add-ons that a given user can subscribe to [3]. Although traditionally the number of subscription configurations rarely exceeded 4, today this number is increasing exponentially. This is due to the need to accommodate services to different user requirements, resulting in many SaaS exceeding 1,000 subscription configurations. Some examples are Postman with 1,412 subscription configurations, Github with 8,960 or, the most egregious example, Salesforce with 12,544 [3]. Thus, we need tools to ease the comprehension of SaaS pricing models.

This work addresses this issue by providing a method compatible with any SaaS. We propose measuring two novel metrics to ease the understanding of features and subscription relevance: Feature Relevance Score (FRS) and Subscription Relevance Score (SRS). These are metrics that measure the impact of subscriptions and features on the SaaS's revenue, and are extracted through the subscriptions' prices and adoption percentages. Specifically, the FRS of a given feature uses the price and adoption percentages of the subscriptions that provide the aforementioned feature, while the SRS of a given subscription is derived from the FRS of the features it provides. Let us provide an example. Given a SaaS with a pricing model as presented in Fig. 1, with the specified prices and adoption percentages. Assuming that all plans and add-ons of a given pricing model are compatible, the number of combinations can be deduced by applying the following formula: $C = P \times 2^A$, where C is the number of configurations, P is the number of plans and A is the number of add-ons [3]. Therefore, this SaaS has a total of 24 subscription configurations [$3 \times 2^3 = 24$], which makes it somewhat challenging to analyse. Our proposal inspects the relations between features and subscriptions and extracts the FRS and SRS metrics from the price and adoption rate of subscriptions, as seen in Fig. 2. FRS of common features are not considered, as they do not infer in subscription relevance.

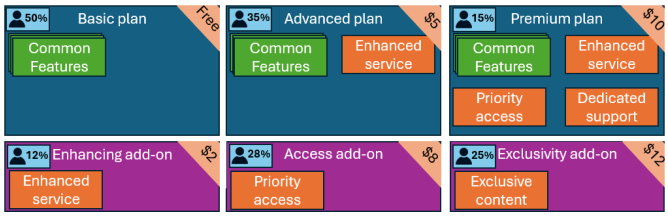

Fig. 1. SaaS pricing example. For each subscription (plans in blue and add-ons in purple), the adoption rate is found on the top-left and the price on the top-right.

2 Feature and Subscription Relevance Scoring

This work identifies a lack of tools that aid SaaS owners in adapting pricing models for their products, and addresses this issue by providing a mathemati-

Bwye, M., Müller, C., Parejo, J. A., Ruiz-Cortés, A.: Feature and Subscription Relevance in Software-as-a-Service Pricing. In: Boubeta-Puig, J. (ed.) Actas de las XX Jornadas de Ciencia e Ingeniería de Servicios (JCIS 2025). SISTEDES (2025). https://hdl.handle.net/11705/JCIS/2025/16

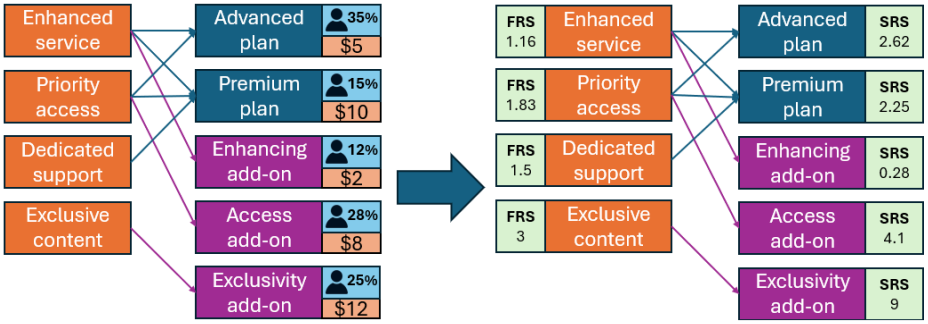

Fig. 2. Relation between features and subscriptions. Adoption rates and prices (left) are used to determine FRS and SRS values (right).

cal solution by introducing two novel metrics that evaluate the performance of features and subscriptions of an existing SaaS: FRS and SRS.

Features may be classified as *common features* or *key features*. If F is the set of all features, common features F_c are those that are available in all plans S_p, while key features F_k are those that are not available in all plans. In short, common features define the core of the SaaS, while key features act as enhancements to the service that must be paid to be accessed [4]. When defining the pricing model, the owner of the SaaS identifies common and key features. Our solution only inspects the impact of key features F_k, as common features do not affect the user's choice of subscription.

The FRS of a feature f is obtained by averaging the ratio of price and percentage of adoption of each subscription $s \in S_f$ that provides the feature f (equation 1). This metric measures the impact of f on the success of the SaaS. Once the impact of the features is known, the FRS can be used to gauge the impact of subscriptions (SRS). By averaging out the FRS of the features of subscription s and weighing it by the subscription price p_s and the percentage of adoption u_s, the SRS is determined (equation 2). Taking the previous example, in figure 2, the "Enhanced service" feature belongs to three subscriptions. Given the different adoption percentages and prices, the FRS of this feature is: $FRS(f_1) = \frac{0.35\times5+0.15\times10+12\times2}{3} = 1.16$. Given the different FRS, we can then obtain the SRS of "Advanced plan": $SRS(s_1) = 0.35\times5\times\left(\frac{1.16+1.83+1.5}{3}\right) = 2.62$.

$$FRS(f) = \frac{\sum_{s\in S_f} u_s \times p_s}{|S_f|} \tag{1}$$

$$SRS(s) = u_s \times p_s \times \left(\frac{\sum_{f\in F_s\cap F_k} FRS(f)}{|F_s \cap F_k|}\right) \tag{2}$$

These metrics can provide insight on subscriptions that are underperforming and what features seem to be more impactful on user subscription choice. If we

examine the example previously introduced, "Enhancing add-on" seems to be underperforming, while "Exclusivity add-on" seems to be successful. Perhaps the former could be improved by providing more interesting features, and the latter could have its price increased to increase revenue.

3 Conclusions

This work introduces two new metrics, FRS and SRS, that aim to intuitively describe the relevance of features and subscriptions of SaaS pricing models. These metrics are extracted from operating the price and percentage of adoption of the different subscriptions of the SaaS, making it a universal contribution in this context. The utility of these metrics can be seen in how much simpler the visualisation of the performance of the different subscriptions and features becomes. This is especially true when operating with SaaS with a large number of subscription configurations. However, this work intends to be the first step in this direction, as these metrics can be further explored to be used in different self-adapting SaaS pricing solutions, such as machine learning and optimisation problems. More metrics may be extracted from these when analysed, such as weighted feature overlap between subscriptions, that could infer how different subscriptions of one same SaaS compete with each other. In our case, we have been working on measuring the cost incurred by users of a SaaS based on their subscription, which, in conjunction with this work, strides towards a method of tailoring subscription prices to a combination of cost and willingness to pay [1]. In conclusion, this work aims to open a world of possibilities by universally quantifying performance of features and subscriptions in the context of SaaS.

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