This work deals with two models – from the quantum eld theory it is the massless scalar electrodynamics (the so-called Coleman-Weinberg model) and from quantum mechanics it is the contact (-function) potential (in two dimensions) – that are apparently invariant under some sort of scale transformations and thus they, in suitably chosen units, contain only dimensionless parameters. It turns out that even in the quantum-mechanical case one has to add an additional procedure to the formal denition of the model and that the use of dierent physical regulators leads to the same results, that furthermore agree with the predictions of the mathematically rigorous method of self-adjoint operator extensions. In this work, we present detailed calculations supporting this result. Contrary to the common literature, we do so in a straightforward manner, which can be followed step by step (with all the necessary elements of functional analysis summarised in the Appendix). In quantum eld theory we apply a similar approach, when we “rediscover” the results of the abstract functional methods in the ordinary perturbation theory. In its framework, we further show how to obtain predictions also for other quantities than particle masses.