Stage de master – MSc internship
Planning ramp-up management projects using modelling and simulation

Overview of the topic:
In order to keep up with increasing customer requirements, manufacturing and service industries are experiencing more frequent product and service development and introduction into the market. This led to tremendous increase of offering variety, which opens up the opportunity to reinforce firm’s competitiveness at the expense of higher variety-induced complexity. Such complexity coupled with uncertainty and lack of process maturity put major challenges ahead of companies. Ramp-up management comes into play at this point as it is specifically concerned with ensuring efficient ramp-up of products and services. Ramp-up can be defined as a value creation phase separating prototype realization from series production (Schmitt et al. 2018).

During industrialisation projects the ramp-up phase needs to be carefully addressed in order to ensure successful products and services introduction into the market. Ramp-up management is relevant not only to this phase of product or service life cycle, but also during the operation phase when a firm experiences a radical change in market demand (Slamanig and Winkler 2011). The COVID 19 is a perfect example of this situation, as it led many companies to think through their whole portfolios to ultimately adapt to the demand of certain products (e.g. personal protective equipment, staple consumers products) and services (healthcare, energy supply, etc.).

Current MSc research project is concerned with ramp-up management in the context of multi-variant production and considering the crisis context. In this sense, the aim is to support decision making on quick adaptation of firm’s capacity to market demand through ramp-up and ramp-down of the production. While previous research of the team relied on analytical models to conduct cost-benefit analyses of different ramp-up management strategies with some restrictive assumptions (Medini et al. 2020a,b), current project will focus on the use of simulation in order to deal with complexity (stemming from multi-variant production) and uncertainty (induced by market and lack of process maturity). The design of the simulation model will rely on the review of related literature and on the requirements of the application domain (cycling industry). One option could involve a hybrid simulation coupling discrete event and agent based given its relevance to the research problem (Medini et al., 2020c). However, these decisions will be studied during the internship. The research project will be conducted in the framework of the RAMP-UP Seed project (https://www.future-industry.org/research/advanced-manufacturing/ramp-up/) and in collaboration with a company from cycling industry.

Desired candidate skills: System engineering, simulation, industrial management.
Location: Mines Saint-Etienne.
Laboratory: LIMOS (UMR 6158) – Laboratory of Computing, Modelling and Optimization of the Systems.
Supervisor: Khaled Medini
Period: 5 to 6 months starting from February/March 2020.
Salary: 577€/month (in the form of internship scholarship).
Application:
  – The application should include: short résumé, cover letter, transcripts of the past two years (including partial results of the current semester, if any).
  – Application and any request should be emailed to: khaled.medini@emse.fr