Digital Re-distributed Manufacturing (RdM) Studio
RECODE Network

Executive Summary
The vision of this project is to pilot future Re-distributed Manufacturing (RdM) business models to dynamically identify optimal scenarios for consumer goods industry. The project will develop a Digital RdM Studio that will enable data-driven experimentation with different business models for the consumer goods industry. This project addresses the need to predict a future RdM business model based on data-driven experimentation with a range of possible scenarios. There are no current tools in research or practice that support this. The research question we are addressing in this study is “How can data-driven decisions predict a future RdM business model?” The research aims to develop a set of RdM business models for the consumer goods industry and outline a Digital RdM Studio that will enable data-driven experimentation with business model designs.

Feasibility Study Objectives:

- Identify current RdM business models
- Pilot selected future RdM business models
- Contribute to the RECODE roadmap of research

Both the System Dynamics and IDEF0 models provide a means to explore new routes to market for products developed by RdM and the implementation of RdM production itself. This research has also proposed a conceptual model (Figure 1) which provides a theoretical foundation for sustainable RdM business models based on data-driven decision making. The conceptual framework incorporates three parts: data collection and analytics, data-driven decision making, and the sustainable re-distributed manufacturing business models. This framework explains how to develop sustainable RdM business models based on data analytics and simulations. Figure 2 shows the business model developed for the ‘ShoeLab’ case study, which is a project that aims to develop a proof of principle for a smart and sustainable 3D printed shoe.
Feasibility study conclusions

The following findings have been made in the course of this research:

- New business models for RdM have been developed, focused on the ShoeLab case study.
- A conceptual framework for RdM business model development has been put forward.
- Significant scope exists for dynamic inclusion of manufacturing data and assisted decision making in business model development.
- Circularity issues and a consideration of Lifecycle Assessment are recognised and addressed in the RdM business models.

The overall aim of this feasibility study was to establish if it was possible to construct new business models for RdM production and to scope out an environment for their potential dynamic production based on available big data streams. In developing both IDEF0 and SD models, this study has contributed to the area of RdM and provide theoretical underpinning for new forms of business enabled by this form of manufacturing. The further development of an autonomous environment for business model production is a future aim of this project.

Impact and future research

The EPSRC-ESRC funded network in consumer goods, big data and Re-distributed Manufacturing (RECODE) has been created to develop an active and engaged community to identify, test and evaluate a multi-disciplinary vision and re-search agenda associated with the application of big data in the transition towards a re-distributed manufacturing model for consumer goods. In the future development of the Digital RdM Studio, big data sources such as real-time manufacturing streams and external data (e.g. marketing trends, social media, etc.) relevant to business model decision making will be made available to the system for enhanced decision making in RdM model development. The RdM Digital Studio will become a fully integrated software platform eventually capable of generating new business models autonomously, based on data points dynamically provided in real-time. To pursue these developments of RdM Studio, an EPSRC proposal will be submitted via the responsive mode.

Figure 2 ShoeLab RdM Business Model