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## The price of sustainable supply? The balance between sustainability and stakeholder priorities using product design to optimise business performance through knowledge based partnerships

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As awareness of environmental issues increases, pressure is mounting for all companies in the UK to act on and improve their overall sustainability performance. The resulting corporate image implications mean that there has never been a more critical time to consider sustainability. Design has a crucial influence on the sustainable credentials of resulting products which, in turn, impact the supply chain. As retailers seek to drive up their sustainable credentials SME partners are having to in turn demonstrate sustainable strategies to maintain their supplier status. This paper will consider the impact sustainable product design can have on SME business performance and to what extent sustainability can be a driving force. A recent survey conducted by the British Standards Institute (BSI) group states that 70% of executives in UK corporations 'view sustainability as a driver for innovation and growth'. It is therefore imperative for supplier and partner companies to practice sustainability to fruitfully engage with company and stakeholder sustainability objectives. This study will provide an objective and unique insight into the drivers for sustainability in an SME business context. Using a number of case studies, this paper will draw conclusions on the importance of sustainability to the supply chain, stakeholders and customers within a retail environment. It will evaluate this information against other critical factors such as cost and lead times. As a result, this paper will highlight the broad impacts of the outputs of sustainable product design and present the effects on business to business relations and overall sales performance.

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## *In situ* processing of intermetallic coatings

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Coatings protect mechanical components against the deleterious effects of wear and corrosion postponing the onset and/or the rate of degradation. Equipment of processing industries has been successfully protected with superalloys coatings. However, as a higher efficiency is imposed working temperatures increase and a better response from materials is required. Advance materials and technologies are required to meet this challenge. This study contributes to this argument by addressing the processing and understanding of the performance of intermetallic coatings of two systems: Nb-Al-Si and Ni-Al, respectively. *In situ* synthesis of the ordered alloys occurs during the deposition of powder mixtures by Plasma transferred arc. The exothermal synthesis contributed to increase the available heat during deposition mitigating the poor weldability expected from these alloys. The Si content in the NbAlSi powder mixture illustrates the determining effect of the deposited chemical composition on the microstructure of coatings. The important role of the interaction with the substrate is shown by the change in the characteristics of NiAl coatings. Coatings hardness increased with dilution associated with the change in the point defect structure whereas the composition determined high temperature wear performance of coatings. The study shows that *in situ* synthesis allows tailoring coatings but the understanding of the interaction with the substrate determines coating properties. This is of particular relevance since the interrelationship microstructure-properties in ordered structures are different from that of conventional solid solution materials.

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