BU PHD MATCHED FUNDED STUDENTSHIPS 2018 PROPOSAL FORM

1. PROJECT DETAILS

Project Title

Making Logistics Collaborative Processes Trustable

Project Summary

Fierce competition among logistics service providers limits the desire and opportunity to share and communicate data among different stakeholders. The trends of (mainly vertical) coordination, collaboration, competition and data sharing within the logistics service sector require a new services platform. Acquiring targeted, consistent and homogeneous data and information enables proper assessment of existing problems and can improve efficiency, sustainability, and resiliency of logistics services. Further, understanding the demand of logistics services and even more being able to anticipate or influence would help to create more efficient new logistics business models. This project aims to achieve a trustable logistics collaborative processes with the right quality, reliable content, freight flows in operations, and activities that allow different logistics services related providers and customers to access.

Logistics as an industry has evolved considerably in last few decades. The most significant advancements in modern logistics are undoubtedly the emergence of third party logistics (3PL) and more recently the fourth party logistics (4PL). A third-party logistics (3PL) service provider is an external supplier that performs part or all of the logistics functions of companies, including transportation, warehousing, distribution, documentation, and so on (Marasco, 2008; Sohail and Sohal, 2003). However, with the development of outsourcing and the rising expectations on product quality and service level of customers, unique and comprehensive supply chain solutions can no longer be achieved by a single 3PL provider. Thus, a new generation of logistics provider, 4PL, has been emerged as a breakthrough solution to meet modern logistics challenges (Win, 2008). The initial concept of 4PL was introduced by Accenture, which functions as an integrator that assembles the resources, capability, and technology of its own organisation and other organisations to design, build, and run comprehensive, concerted supply chain solutions (Chen and Su, 2010; Yao, 2010). It has been gradually proven that the 4PL can exceed 3PL as the logistics new business model and will become the dominant development direction of the logistics industry either in theory or in practice for the next decade (Warrilow and Beaumont, 2007; Yao, 2010).

The project will:

• Analyze the requirements of secure logistics collaborative process execution in a real-world context

• Identify an appropriate case study formulate a formal theory/framework for secure logisitcs collaborative processes

• Develop a tool for verifying and enforcing the security compliance

• Evaluate the theory against the case through a prototype and a formal verification

• Develop security policies appropriate for the case in the context of logistics collaborative processes

- Chen, K.H. and Su, C.T., 2010. Activity assigning of fourth party logistics by particle swam optimisation-based pre-emptive fuzzy integer goal programming. Expert Systems with Applications 37: 3630-3637.

- Marino, G., 2002. The ABCs of 4PLs. Industrial Management 44(5): 23-28.

- M. S. Sohail and Sohal, A. S., "The use of third party logistics services: a Malaysian perspective," Technovation, 2003. 23(5): pp. 401-408.

- Warrilow, D. and Beaumont, C., 2007. 3PLs vs. 4PLs the great debate. Logistics & Transport Focus 9(6): 30-33.

- Win, A., "The value a 4PL provider can contribute to an organisation," International Journal of Physical Distribution & Logistics Management, 2008. 38(9): pp. 674-684.

- Yao, J.M., 2010. Decision optimisation analysis on supply chain resource integration in fourth party logistics. Journal of manufacturing Systems 29(4): 121-129.

Academic Impact

The proposed research will have significant impacts in two aspects. Firstly, it addresses the critical security issues in logistics collaboration and provides solutions for the design and integration of secured business services. Secondly, this research work contributes toward developing a tool that is necessary for verifying and enforcing the security compliance.

Existing business process management methodologies seldom consider the trustable issues relating to logistics collaborative processes and legal requirements. This project contributes to the development of next generation technologies leading to a massively distributed computing infrastructure made up of many different, interoperable, internet based software services.

Research results of the developed model and framework are expected to be published in prestigious international conferences and journals in the areas of service management and information system etc. such as ICSOC, ICWS, PRO-VE, and Springer's Service Oriented Computing and Applications. An applicable SOA security prototype, together with the proposed access control framework, will be built and demonstrate at international conferences, seminars and workshops for knowledge dissemination. Extensions to current model and prototype for access control will be considered in service based IT systems.

Societal Impact

This project aims to increase the efficiency of logistics collabrative operations in order to serve clients and customers, and hence sustainability in the logistics supply-chain, in the meantime removing the communication bottlenecks in the interaction of different stakeholders and thereby improving the potential for collaboration. The expected impact of the project lies in a number of aspects, including business impact, environmental impact, and impact on Yingkou Gangrong Big Data Co. Ltd., who provides logisitics services.

Training Opportunities

The training programme will be directed by Dr. L. Xu and Dr. H. Yu. The training programme required will be structured in line with the research programme. The training will be achieved via completion of training courses through our EU H2020 Research and Innovation Staff Exchange FIRST project, monitoring and hands-on, one-to-one experiential training, as appropriate. The knowledge acquired through the work will be further disseminated through seminars and joint papers.

The PhD researcher focus lies on general business modelling classifications, ontologies related data/information, services and processes; semantic process discovery methods, service-oriented process versification methods, business process variability as we as process verification methods. This includes the analysis of different ontologies, integrated/mapped different ontologies, and ontology evolutions. Further we encourage the student to attend conferences and workshops for his/her submissions.

2. SUPERVISORY TEAM	
First supervisor <u>only</u>	Name: Lai Xu
List Additional supervisors	Hongchuan Yu
Recent publications by supervisors relevant to this project	- Xu L., de Vrieze P., Yu H., Phalp K., and Bai Y. (2018) Interoperability of Virtual Factory: an Overview of Concepts and Research Challenges. International Journal of Mechatronics and Manufacturing Systems. (Accepted) - de Vrieze P, Xu L. (2018) Resilience Analysis of Service Oriented Collaboration Process Management systems. Service Oriented Computing and Applications. Springer. (Accepted) - Xu L, de Vrieze P. (2017) Supporting Collaborative Business Processes: a BPaaS Approach. International Journal of Simulation and Process Modelling. Inderscience. (http://www.inderscience.com/info/ingeneral/forthcoming.php?jcode=IJSPM)

- Aiello M., Bai Y., Cabri G., Eder N., Mandreoli F., Mecella M., Mu H., Phalp K., de Vrieze P., Xu L. and Yu H. (2017) FIRST - virtual Factories: Interoperation suppoRting buSiness innovaTion. (Poster). European Project Space (EPS) at the 9th International Joint Conference on Knowledge Discovery, Knowledge Engineering and Knowledge Management. Funchal, Madeira, Portugal, 1-3 Nov. 2017.
- Sang G, Xu L, de Vrieze P. (2017) Simplifying Big Data Analytics System with A Reference Architecture. In: 18th IFIP Working Conference on Virtual Enterprises (PRO-VE 2017), Vicenza, Italy, 18 - 20 Sep 2017. Springer.
- Kasse JP, Xu L, de Vrieze P (2017) A Comparative Assessment of Collaborative Business Process Verification Approaches. In: 18th IFIP Working Conference on Virtual Enterprises (PRO-VE 2017), Vicenza, Italy, 18 Sep 2017 - 20 Sep 2017. Springer.
- Aiello M., Bai Y., Cabri G., Eder N., Mandreoli F., Mecella M., Mu H., Phalp K., de Vrieze P., Xu L. and Yu H. 2017. EU H2020 FIRST- vF Interoperation suppoRting buSiness innovation. In: Network Plus: Industrial Systems in the Digital Age Conference 2017 20-21 June 2017 Glasgow, UK.
- Samdantsoodol, A., Cang, S., Yu, H., Eardley, A. and Buyantsogt, A., 2017. Predicting the relationships between virtual enterprises and agility in supply chains. EXPERT SYSTEMS WITH APPLICATIONS, 84, 58-73.
- Shamim, S., Cang, S., Yu, H. and Li, Y., 2017. Examining the Feasibilities of Industry 4.0 for the Hospitality Sector with the Lens of Management Practice. ENERGIES, 10 (4).

INFORMAL ENQUIRIES

To discuss this opportunity further, please contact Paul de Vrieze via email: lxu@bournemouth.ac.uk

ELIGBILITY CRITERIA

Studentship candidates must demonstrate outstanding academic potential with preferably a 1st class honours degree and/or a Master's degree with distinction or equivalent Grade Point Average. An IELTS (Academic) score of 6.5 minimum (with a minimum 5.5 in each component) is essential for candidates for whom English is not their first language. In addition to satisfying basic entry criteria, BU will look closely at the qualities, skills and background of each candidate and what they can bring to their chosen research project in order to ensure successful completion.

Additional Eligibility

HOW TO APPLY

Please complete the online application form by **XXXX**.   Further information on the application process can be found at: www.bournemouth.ac.uk/studentships