Redefining Productivity through Inter-Firm Operations and Supply Chains

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INTRODUCTION

Traditionally, productivity is defined as the measure of outputs "produced" for any given number of inputs. This measure seeks to establish a best practice indicator relative to the allocation of resources, be it labour, capital, available technology, cost of inputs, or scale of operations and is generally applied at a firm level. Further, firm level data are then often aggregated based on geography, industry or industry sub-sector and are used largely for comparative purposes and to measure changes in productivity over time [1].

Supply Chain Management (SCM) is the management of physical goods, information and financial flows (bi-directional) from the point of raw material through to the point of consumption [2]. Examples such as Dell, Nokia, Proctor and Gamble, Toyota, Walmart, Zara and others illustrate how significant value can be created for firms within the supply chain when activities are co-ordinated between firms (inter-firm) and across the end-to-end supply chain [3]. There is growing evidence that the global competitive landscape is changing from one where individual firms compete with each other to where competition is between entire supply chains [4] [5]. This is supported by Gattorna [6] who states that "*we must wake up to the fact that it is 'supply chain versus supply chain' from now on, rather than company versus company as in the past. Within a decade it will be networks versus networks*". Gattorna also predicts that "*during the next decade it will become progressively more difficult for enterprises to stand alone and compete successfully in their marketplaces*" [6, p.8].

Supply chains are often depicted as being singular and linear in nature and based in manufacturing. Figure 1 is a typical illustration of how supply chain management is depicted with movements of goods from raw materials supplier to manufacturer to distributor to retailer and finally to the end consumer, and in a similar vein bi-directional flow of information across organisations. However, it is also likely that the same organisation may belong to multiple supply chains and often adopt multiple supply chain strategies within its own operations [6].

Figure 1 Illustration of a typical supply chain

Supply chain management is as important in the services sector as in other sectors such as manufacturing. The services sector represents over 70% of Australia's Gross Domestic Product (GDP). Productivity and inter-firm productivity apply equally to the services sector as to manufacturing and other industry sectors.

In the past, business disciplines and organisational studies have focused on single firm and intra-firm activities, relations, measures and behaviours. Where inter-firm studies have been conducted, they have largely been from a comparative perspective. However, inter-firm innovations include the introduction of new and improved business processes which are often cited as the examples for delivering unprecedented efficiencies [7]. Examples of such inter-firm business processes are Efficient Customer Response (ECR); Collaborative Planning, Forecasting and Response (CPFR) and Vendor Managed Inventory (VMI)[7]. The introduction of new business processes has required unprecedented levels of co-operation, collaboration, and integration.

Given the introduction of such integrated business processes, the creation of supply/value chains and the changing competitive landscape extending beyond the single firm, it is necessary to recognise and accept supply chains as a valid business grouping. In doing so, we extend the current single firm productivity measures and make an attempt to apply a productivity measure to inter-firm processing. As such, in this conceptual paper we aim to make several contributions to the literature. First, we recognise the importance of inter-firm and multi-firm operations, that is, supply chains, as a single unit of analysis from the perspective of productivity measure. Second, we explore productivity and move beyond the single firm input-process-output model, thus pushing the boundaries to

encapsulate inter-firm operations. Third, we explore conceptually an inter-firm productivity equation and introduce the notion of an efficiency measure, referred to as *collaborative efficiency*.
This paper is organised in four sections. Firstly we introduce the basic concepts of productivity after which we illustrate how firms are embedded in geographic and industry structures. This highlights the white space between firms where measurement of inter-firm productivity is made possible. We explore the make-up of our new inter-firm productivity measure termed, *collaborative efficiency*. We conclude by recognising the limitations of this study and suggesting areas of further examination and future research, where inter-firm and multi-firm operations can be treated as a single unit of operations.

PRODUCTIVITY

Productivity has long been the holy grail of firms, regions, industries, and nations to measure the efficiency of resource allocation and production. In essence, productivity is the measure of the number of outputs that can be produced for any given number of inputs [1] defined as follows:

Productivity = outputs/inputs (1)

Calculation of single factor productivity, that is, where there is only one input and one output to consider is relatively simple [1]. However, multiple inputs are often used to produce multiple outputs. Where this is the case, productivity is referred to as Multi-Factor Productivity (MFP) or Total Factor Productivity (TFP) [1]. These calculations become much more difficult and require sophisticated mathematical equations to achieve a quantitative measure of productivity [1].

Examination of the extant literature reveals links between productivity and economic theories, efficiency measures and operations. The three economic theories that have been applied extensively to productivity are Neo-ClassicalGrowth Theory, Endogenous Growth Theory and the New Economic Geography Model [8]. Measures were applied and grouped into four efficiency groups, these are allocative efficiency, cost efficiency, technical efficiency and scale efficiency [9]. Schmenner [10] and further Agarwal and Selen [11] link the productivity diagonal to a service firms operation via their Service Productivity Matrix [10] and Service Cubicle [11].

Economic theories related to Productivity

Three different economic theories linking regional or geographic productivity and growth were covered in the literature. Neo-classical growth theory identified that regional differences in productivity is due to different factor endowments. These are seen in the varying capital, labour and

technology differences [8]. Endogenous Growth Theory identifies the knowledge base and proportions of the workforce employed in knowledge producing industries as the underpinning difference across regions [12]. The New Economic Geography Models relies on spatial agglomeration, specialization clustering and economic integration as the foundations of productivity improvements, growth and globalisation [13].

Efficiency measures of Productivity

According to Sherman [9], there are four efficiency measures for productivity, namely allocative efficiency; scale efficiency; technical efficiency and price efficiency. Allocative efficiency examines the optimal mix of inputs at prevailing prices. Scale efficiency relates to activity or volume levels that are able to be managed within the firm, without compromising any of the other efficiency measures. Technical inefficiency exists when it is possible to augment outputs or inputs, that is, to produce more outputs with the same or fewer inputs or alternatively where it is possible to produce the same outputs with fewer inputs. Price efficiency relates to the cost of purchasing inputs that meet the desired quality standard [9]. These measures of productivity take an organisational view of the factors of production and looks to reduce cost or labour inputs and increase outputs as measured by units of production. These measures fail to recognise that an output, especially in the services sector requires the view point of the customer and as such requires value to be included as a measure [14].

Based on extant literature, a number of factors have been identified as influencing productivity, these include wages and remuneration [15], level of education and skill [16], terms of trade and foreign exchange rates [17], new economy, qualifications [18], innovation [19] [20], X-factor [21], the levels of research and development [22], structural change [18], use of standards [23] , entrepreneurship, capital investment in technical and non-technical aspects and intellectual capital [8]. In the literature each of the above were considered in isolation to each other and as such there is a failure to provide a holistic and systemic view illustrating the dynamic nature that productivity ought to have – be it at a firm, geography, industry or industry sub-sector level. Due to the complexity, this area is recognised as an area for further study.

Link of Productivity to Service Operations Management and Service Value Networks

Recognising the importance of services Schmenner [10] developed the Service Productivity Matrix (as shown in Figure 2) which provided four operating models, that of Service Factory (SF), Mass Service (MS), Service Shop (SS) and Professional services (PS). Productivity levels for each of

the service models are underpinned by the degree of interaction and customisation (x-axis) and the degree of labour intensity (y-axis) [10].

A number of criticisms of the models led to two meaningful modifications. The first was the recognition that interaction and customization did not always move in the same direction resulting in a change of term from customer interaction and customization to 'degree of variation'. The second modification included the linking of labour activity to theory, namely the Theory of Swift, Even Flow. This resulted in the y axis of the matrix being referred to measuring the 'degree of relative throughput time' (as measured for services) rather than the degree of labour intensity [10] with the arrow showing the 'diagonal of productivity'. That is, as the Degree of Variation and the Degree of Relative Throughput decreases productivity increases.

Degree of Labour Intensity Changed to degree of Relative Throughput (y axis)	Degree of Interaction and Customisation (changed to degree of Variation) (x axis)	
	Low	High
Low	Service Factory (SF) Airlines Trucking Hotels Resorts	Service Shop (SS)_ Hospitals Auto repair Other repair services
High	Mass Service (MS) Retailing Wholesaling Schools Retail aspects of commercial banking	Professional service (PS) Doctors Lawyers Accountants Architects

Figure 2 Service Productivity Matrix (Source Schmenner 2004)

Agarwal and Selen [11] recognize that innovations in technology and telecommunications contribute to the transformation of industries and organizational growth in the form of a service value network (recognising that integration with external organisations plays an important role in delivering efficiencies and productivity gains). They use this to build on Schmenner's Service Matrix and this is achievedby adding a third axis (z-axis) titled 'Degree of Technovation' [11]. The Degree of

Technovation axis illustrates that degrees of innovation and technology adopted by an organisation affects their productivity levels. The inclusion of this third dimension adds to the Service Process Matrix and creates a Service Cubicle Framework as illustrated in Figure 3, with the 'diagonal of productivity' also shown.

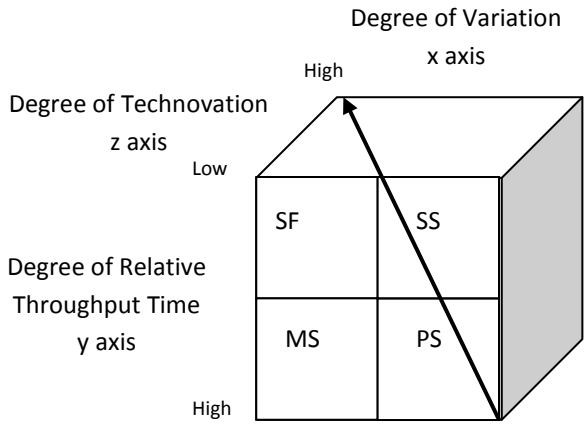

Figure 3 Service Cubicle (Source: Agarwal and Selen 2005)

Whilst this Service Cubicle recognises the importance of integration and collaboration, both frameworks, Schmenner's [10] and Agarwal and Selen's [11] take an intra-organisational view when mapping an organisation's operations. Schmenner's framework is based on a single organisation view point and fails to describe the details on the specific make up of the degrees; thus not specifically the operationalisation of these dimensions. In a similar vein, Agarwal and Selen [11] have theoretically furthered the notion of the productivity diagonal to the next level in the context of service value networks, but have also failed to operationalise the underpinning dimensions. Hence, this is an area for further research. An attempt is made to operationalise the service cubicle by defining the underpinning dimension and to incorporate the effects of inter-firm collaboration and integration.

Factors influencing productivity

A further attempt was made to examine dynamics between various drivers of productivity in Gamblin, Green and Hogarth's "*Exploring Links to Better Skills and Productivity: Final Report*" [8]. They identified five key complementary and inter-dependent drivers to productivity. These are: skills, innovation, enterprise, competition and investment [8]. Indicators as opposed to specific measures were provided. This analysis provides a more systemic view of productivity within a skills and enterprise boundary. It also highlights a gap in the literature; this being that there is no holistic

or systemic view of productivity which incorporates all aspects, that is geographical, industry and supply chains. This area is identified for future research.

Unit of analysis

The literature shows productivity has been examined at various levels; individual worker, business units and enterprises, this later being the most commonly analysed. Aggregation of results was often applied to various geographic groupings such as local area, region or nation. Alternatively the aggregation of data and analysis was applied at an industry sub-sector, whole of industry or economy level. Again, the unit of analysis was singular in nature, albeit aggregated. The data were aggregated and used for comparative purposes, that is, to establish and measure against what would be referred to as “best practice” or to compare the changes of productivity levels across time [1].

The interests in productivity measure indicators are three fold. Firstly to provide a single point in time snap shot of the number of outputs that can be produced with any given number of inputs for a single entity (generally a firm) which enables the establishment of “best practice” and comparisons between firms. Secondly, data may be aggregated to enable a view at a geographic unit such as local area, region or nation or a business grouping such as industry sub-sector, industry or economy. Third, productivity movements are measured across two time points in order to determine the rates of productivity change, be it growth or decline [1].

Whilst these grouping of analysis are of interest, the literature fails in two aspects. Firstly a number of influencing factors were identified; however, there was no holistic or systemic view that took into account the dynamic nature of these factors. Second the single firm view of productivity fails to acknowledge supply chains as a valid business unit and the resulting need for examination of inter-firm activities as a single unit of analysis.

Firm level analysis

Figure 4 illustrates the basic input-process-output model that is used to measure productivity of a firm. Inputs are varied in type and typically included labour, capital and technology resources. A single firm productivity view, measures outputs that can be produced with any given number of inputs.

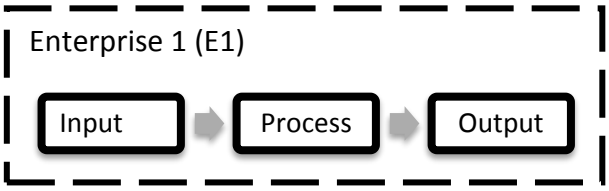

Figure 4 Input – Process – Output view of an enterprise

Here, we embed firms in a hierarchical geographic structure of local, regional and national bases as well as in business groupings of industry sub-sector, industry and economy or market as illustrated in Figure 5. This framework provides a mechanism for establishing the boundaries for the purpose of examining productivity using a dynamic systems approach, which is out of the scope of this paper.

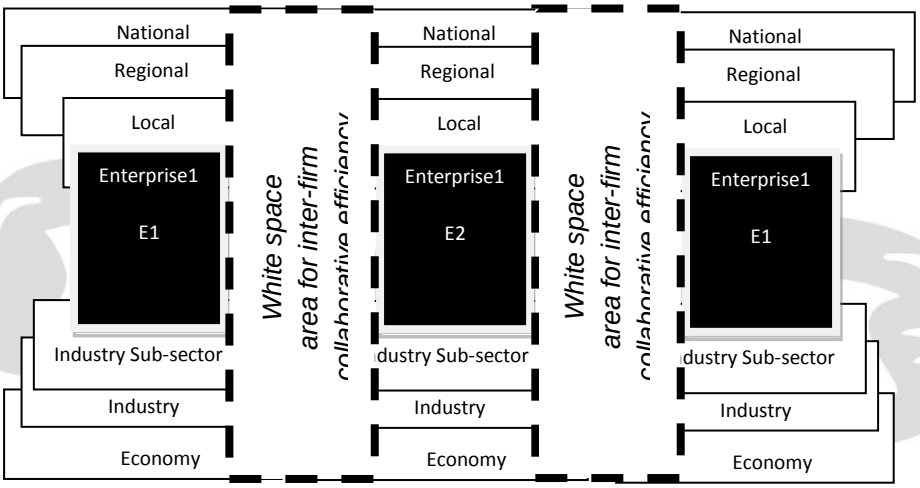

Figure 5 Enterprises embedded in geography and industry groupings including supply chain

Next, supply chains are examined in the context of inter- and intra- firm connectivity.

SUPPLY CHAIN AND INTER AND INTRA- FIRM CONNECTIVITY

A commonly used definition of supply chain identifies it as a collection of organisations that are organised and co-ordinated to enable the transformation and transportation of a product from raw materials to the end consumer. This definition fails to recognise that multiple configurations are possible and probable, the importance of the human element in the form of relationships and that supply chains are equally relevant to services as they are to manufacturing and production. These points are stated explicitly in Gattorna's [6] definition of a supply chain *"Supply chain is any combination of processes, function, activities, relationships and pathways along which products, services, information and financial transactions move in between enterprises in both directions. It*

also involves any and all movement of these elements from the original producer to the ultimate end consumer"[6].

The literature indicates that supply chains compete with each other and their performance depends on their ability to increase efficiency across the whole chain. This can be achieved by reducing non-value adding activities or by moving work or resources within the supply chain so as to provide greater value [24].

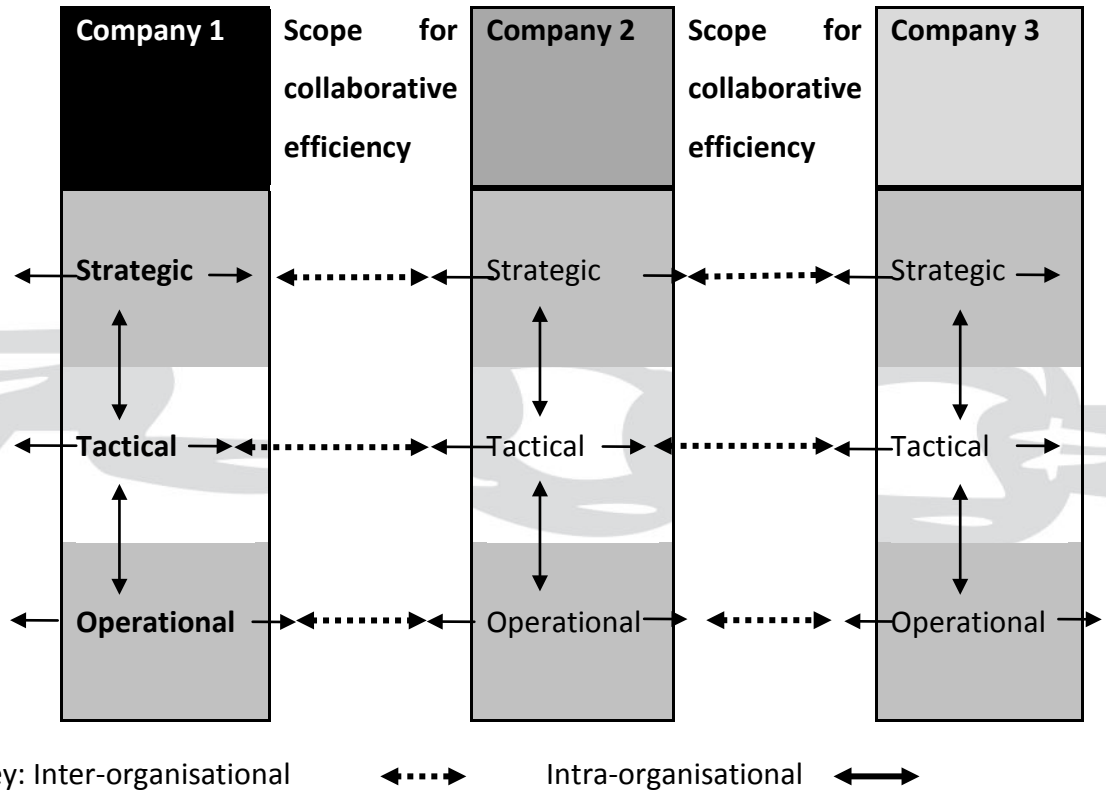

Figure 6 Intra-firm and Inter-firm alignment required to achieve collaboration and integration Source: Barratt (2002)

Agarwal and Selen [16] identify that these supply chain efficiencies can be achieved through collaboration across stakeholders, which is described as moving beyond the realm of simple transaction level co-ordination to strategically focused inter-firm interactions. This point is developed further by Sanders [25] who determine that collaboration is required on both a system and relational basis in order to be strategic. System collaboration is focused at an operational level by aligning technologies to achieve transactional exchange and integration. However, strategic collaboration is more focused on structural alignment, that is, the integration of systems and processes. As such, it requires a greater and longer term commitment from management to achieve

and maintain [4, 16]. Figure 6 is Barratt's [26] illustration showing the multiplicity of alignment that is required. Alignment, collaboration and integration need to occur at all levels throughout and across organisations, that is, at the strategic, tactical and operational levels for it to be effective [26].

The expected outcomes of such alignments include: (1) firms up-skilling through enhanced learning and knowledge development; (2) firms having greater ability to understand and efficiently play their respective roles; (3) firms aiming to be less focused on perusing short term opportunistic goals in an urge to achieve common longer term objectives and outcomes; (4) firms being able to reduce operating costs [4].

As explained earlier, economic theory treats the utilization of skills and the conversion of inputs to outputs as a black box [8], hence we propose that the white space that exists between and across organisations is where the foundation of inter-firm productivity exists, the basis of which is collaboration. Underpinning this inter-firm collaboration, the notion of "*collaborative efficiency*" is discussed next.

COLLABORATION

Inter-organisational collaboration is defined by Gray [27] as "process through which parties who see different aspects of a problem can constructively explore their differences and search for solutions that go beyond their own limited vision of what is possible". While Huxham [28], however, sees collaboration as a process through which organizations exchange information, change activities, share their resources and enhance capacity for the mutual benefit and common purpose and that this is done by sharing risks, rewards and responsibilities" [29]. The key to collaboration is two or more organizations working together to achieve a common goal of which will be of mutual benefit and generally achieves more than each individual organization is able to achieve on its own.

Despite the demonstrated benefits, collaboration is difficult to implement yet some literature implies that collaboration should occur with all trading partners [30]. However, this is refuted by Barratt [26] who acknowledges the resource intensive nature of collaboration. The implication is that organizations should discriminate whom they collaborate with and ensure that collaborative relationships are able to create value [26]. An over reliance on information technology for implementation are also cited as reasons that make collaboration difficult to achieve as is the lack of trust between training partners [26].

A number of frameworks have been established in an attempt to understand the components, indicators and measures of successful collaboration. Such frameworks include Gatorna's (2003) collaborative relationships based on customer-led supply chain segmentation; Pitsis'[29]; Building Blocks of Inter-organisational Synthesis model; Coa and Zhang's [31] Collaborative Advantage model; and Agarwal and Selen's [16] [32] Elevated Service Offering (ESO) model.

Whilst a number of models have been proposed Agarwal and Selen's [32] ESO model provides empirical evidence for innovation in services as a multi-dimensional construct comprised of three distinct measures namely, Strategic ESO, Operational ESO providing productivity benefits and Performance ESO providing performance benefits. This demonstrates how value creation, productivity and performance measures are intertwined in the context of collaborating service organisations.

Inter-firm Productivity

Extant literature provides productivity measures using the traditional single unit input-process-output model as identified previously in Figure 4.

However, when considering supply chains as a unit of study it is necessary to view the chain of enterprises as illustrated in Figure 7, where the output of Enterprise 1 (E1) becomes the input of Enterprise 2 (E2). It should be noted that for the purpose of this paper we focus on the interaction between two firms. Further research is required to determine the implications of inter-firm productivity across the entire supply chain.

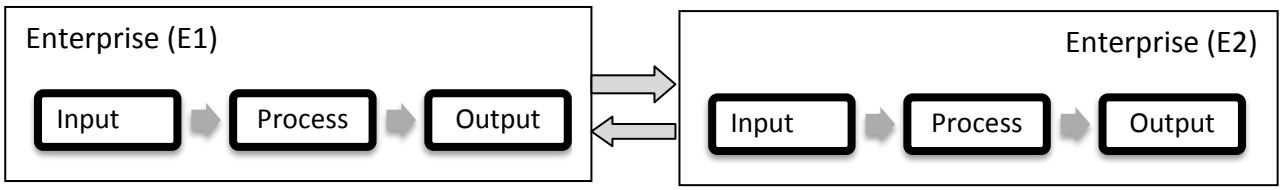

Figure 7 Inter-firm interaction

Based on Figure 7 above, it can be seen that the output from Enterprise (E1) or is equal to the input of Enterprise (E2) or and therefore we explore this as the fundamental concept for a new inter-firm productivity equation depicted as follows:

Inter firm productivity = $Output\ Enterprise\ (E1) = Input\ Enterprise\ (E2)$ (2)

It is worth noting that this equation is true where straight through processing is possible. That is, the output from Enterprise (E1) can be input into the next value adding process operated by Enterprise (E2). That is without any extra resource required to be input from Enterprise (E2) other than the process being interacted with (where additional resource requirements are required, these are recognised as the value of additional resources (VAR)).

Here, we reiterate that scale efficiency, one of the four efficiencies defined earlier, is the key concept utilised; where a firm is able to increase its productivity by changing the scale of its operation such that firms operate at a technically optimal basis [1]. Here, it is the operations of Enterprise (E1) that contribute to improvements in efficiency to Enterprise (E2).

Figure 8 – illustrates the changing dynamics of the integrated supply chain or the extended enterprise establishment, where outputs from Enterprise (E1) are directly input into Enterprise (E2) processes (referred to as straight through processing). Figure 8 further illustrates that the unit of analysis for Enterprise (E2) includes factors affecting the output in Enterprise (E1) such as data formats or information requirements.

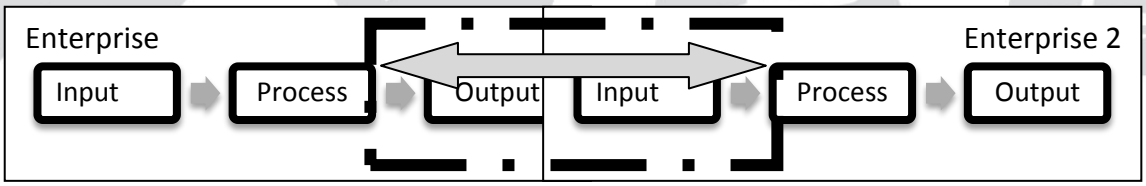

Figure 8 Illustration of the Output = Input dynamics of inter-firm productivity

Due to the nature of services and inter-firm integration, examining productivity (from a single firm's viewpoint) alone is insufficient; it is necessary to examine and consider value and value creation (or detraction) at the inter-firm level. It is for this reason, that a "*value assessment matrix"* as outlined in Table 1 and a "*value assessment pathway*" as illustrated in Figure 10 are created and applied.

Next we briefly describe the foundations of each of the components of the value assessment matrix and then move to explain the value assessment pathway thereafter.

Value assessment matrix

The purpose of the value assessment matrix is to determine if value has been discovered or remains undiscovered and whether the value is known or unknown. In this basis, four possibilities

exist, value may be discovered and known, discovered and unknown, undiscovered and known, or undiscovered and unknown. Discovered and known value is such that value exists and is known by this the other and organization (as shown in box (1) of Table 1), whilst discovered and unknown value is such that the value is known to exist by some other organisations but not known to the organisation in question (as shown in box (2) of Table 1). Whereas, undiscovered and known value is such that value is known to exist but has not yet been applied to a given context and therefore may be discovered in one context but not necessarily discovered in the context of the question (as shown in box (3) of Table 1). Finally, undiscovered and unknown represent value which is deemed to be non- existent and therefore has a value of zero (as shown in box (4) of Table 1). It may be 0 in this context but it might be many contain if it becomes known or discovered.

Table 1 Value Assessment Matrix

	Known	*Unknown*
Discovered	**(1)** **YES** known by this and other organisation	**(2)** **YES** known by some other organisations but not by the organisation in question
Undiscovered	**(3)** **YES** processes that are known to be of value but yet to be discovered or applied in a particular context	**(4)** **No**

Based on this description the value assessment matrix has been developed and we now move to develop the value assessment pathway as illustrated in Figure 10.

Value assessment pathway

Based on the value assessment matrix of value being discovered and known, the value assessment path examines whether a firm is able to establish value utilisation (KUV), value potential (KPV) and value residual (KRV), that is, the firm's decision to avail value if possible. In the case that there is a recognised utility of the value creation, value is defined as real (ReaVal). Where the value exists and is yet to be realised, that is, it remains potential value, then the value is deemed unrealised (UnrVal).

Where value is residual then the value is irrelevant (IrrVal). However, where value is discovered but unknown (UPV), that is value not yet realised but has potential until it is known by the firm, and determination by the firm on whether it will be realised, or is irrelevant, hence in all instances remains as unrealised value (UnrVal). Value that is undiscovered and known may be relevant (RelVal) or irrelevant (IrrVal).

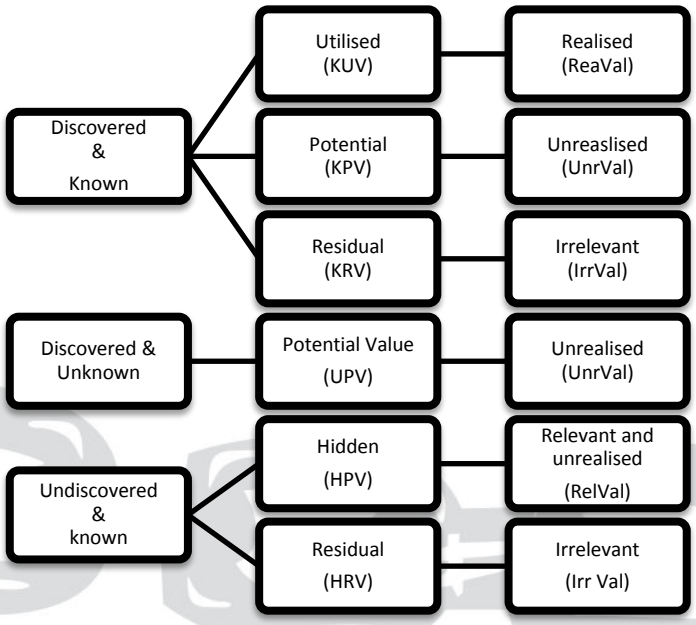

Figure 10 Input value assessment pathway

The value assessment pathway provides a means of determining any intangible benefits that may be provided or be able to be utilized from the inputs of Enterprise (E1).

Inter-firm productivity equation

Moving from single firm productivity to inter-firm productivity we first reiterate the components of efficiency, that is allocative efficiency, cost efficiency, technical efficiency and scale efficiency. The focus of this paper is on technical efficiency. However, the concept of inter-firm productivity would equally apply to the other efficiency measures.

Technical efficiency is defined as being where a firm has optimised output for any given number of inputs [33]. On the other hand, technical inefficiency exists when it is possible to augment outputs or inputs, that is, to produce more outputs with the same or fewer inputs or alternatively where it is possible to produce the same outputs with fewer inputs [33].

Figure 11 shows the point where Enterprise (E1) and Enterprise (E2) processes are fully integrated. At this point the output from Enterprise (E1) is equal to the input of Enterprise (E2). Enterprise (E2) is not required to allocate any resources to value add to the inputs of Enterprise (E1) in order to be able to process them. Where this is the case we determine that the cost of the resources required by Enterprise (E2) to add value to the inputs of Enterprise (E1) is (VAR). This value is detracted from the value of Enterprise (E1) inputs whilst having no effect on the output levels of Enterprise (E2). The effect on Enterprise (E2) is that it now becomes technically inefficient.

Conversely, figure 11 illustrates that the additional input provided to Enterprise (E2) with the positive addition of known utilised value and KUV and KPV known potential value.

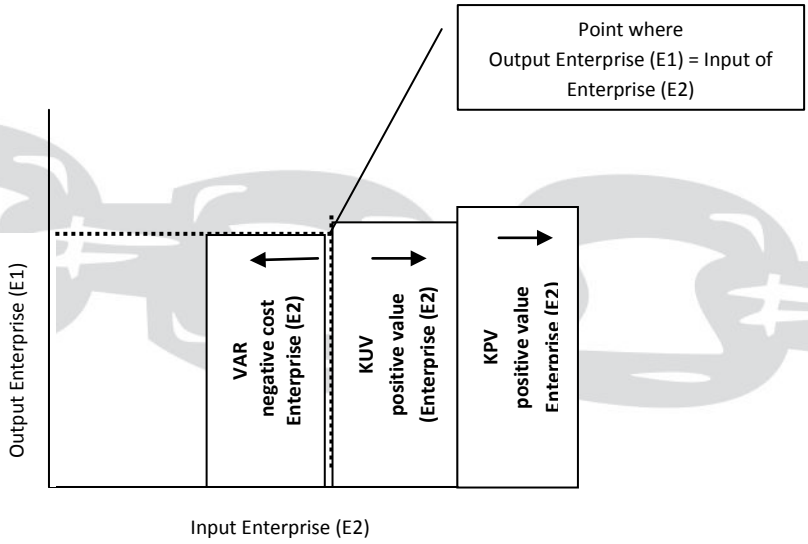

Figure 11 inter-firm productivity graphs

Developing equation two further, where inter-firm productivity is defined as Output Enterprise (E1) is equal to the Input of Enterprise (E2). It is necessary to also include any value (positive or negative). In doing so, the inter-firm productivity equation is extended to include a value component. However we also look to include value as a component of inter-firm productivity and as such determine that inter-firm productivity equation that includes value in its different forms can be defined as follows:

$$Output\ Enterprise\ (E1) = Input\ Enterprise\ (E2) - VAR + (KUV + KPV) \qquad (3)$$

- VAR= the resources that are required by Enterprise (E2)to convert the inputs from Enterprise (E1) into a useable form

- KUV = Known Utilised value over and above the IE2 standard or format
- KPV = Known Potential Value yet which is yet to be realized

Figure 11 is an illustration where the boundaries of productivity are set by what is theoretically possible, rather than best practice through the notion of collaborative efficiency.

FUTURE RESEARCH

Further research is required in several areas. Firstly, in order to gain a more integrated and systemic view of productivity it is recommended that the development of a dynamic systems model of productivity that incorporates contributors and influencers (stocks, flows and feedback loops) to productivity. Utilising the boundaries identified in Figure 5 will provide a more dynamic view of productivity at various points as opposed to a single plane view as is currently the case.

Next, given that collaboration occurs at a strategic, tactical and operational level further research into the characteristics and activities that occur at each level and the impact they have on productivity is worth exploring. Whilst this paper proposes an inter-firm approach it is recommended that further research be conducted across the whole supply chain and it should include global supply chains. This will enable the effects of human elements such as management skills and cultural differences to be better understood and accounted for when examining productivity.

Additionally as business operations and organizational structures move beyond the single firm, this will require productivity to be redefined and new equations to be created. The productivity equations of the future will not only require recognition of outputs as we know them today, but will also require the recognition of value contributions (or detractions) and intellectual property such as know-how and other intangible contributions.

Lastly, the long term implications of supply chain operations on a nations' productive capacity requires examination. Therefore, given the infancy of supply chains being recognized as a valid unit of analysis it is recommended that longitudinal studies be established. Given collaboration provides for transfer of skills and dynamic capability building, longitudinal studies will enable the examination of longer term benefits and effects of the transfer of productive capacity across the chain, the impacts of which are yet to be examined or defined.

CONCLUSION

Productivity measures of the past have focused on the inputs, processes and outputs of a firm with the data being aggregated on a geographic or industry basis. However, competitive landscapes are changing the way in which individual firms and supply chains compete. Changing business dynamics, improved communication and information technology enable innovations in business processes to extend beyond the traditional boundaries of a single firm.

It is time to re-evaluate productivity within. This involves acceptance of supply chains as a valid business grouping and, therefore, the requirement to examine inter-firm productivity. With this comes the realization that the white space that exists between organizations is the space where collaboration is core to successful business process improvement. It is this '*collaborative efficiency*' that will deliver firms, supply chains, industries and nations the productivity gains of the future.

This paper has been about the development of indicators as a social process with norms evolving as a result of the interactions of a community of practice comprising of supply chain agents. The users of the indicators also form communities of practice, within government departments and businesses at both a local and global level. And finally, decisions are made as a result of changes in the productivity indicators which have considerable impact on people, firms, regions and countries – inter- and intra- firms. An important aspect of this work is that value creation is dynamic, changes emphasis in response to economic and social conditions, and expands the domain of discourse through extending coverage of sectors. Therefore, revising the concepts and definitions and recognising the complexity that underlie the measurement and analysis of productivity demand holistic thinking and new knowledge creation.

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Reply Reply All Forward Chat

Paper acceptance for 9th ANZAM Operations, Supply Chain and Services Management Symposium 2011

Vanessa Ratten [vanessaratten@gmail.com]

To: Moira Scerri

Thursday, 5 May 2011 4:33 PM

You forwarded this message on 07 May 2011 2:10 PM

Dear Dr. Moira Scerri,

Congratulations. Your paper INTER-FIRM PRODUCTIVITY has been accepted in the refereed paper stream for the 9th ANZAM Operations, Supply Chain and Services Management Symposium 2011.

Please find below the reviewers comments. Please take these comments into account and send your revised paper by May 17th 2011.

Please note that the earlybird registration package must be made before May 17th 2011.

We look forward to seeing you at the conference.

Best regards

Vanessa Ratten

Dr Vanessa Ratten BA BBus (Hons 1) LLB PhD
Senior Lecturer
Deakin Graduate School of Business
Faculty of Business and Law,
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221 Burwood Highway,
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Title quite short- do the authors want to add more detail to title as interfirm productivity does not fully explain the paper. The ANZAM website guidelines need to be followed- the use of numbered references is confusing. More up to date references are required in the paper. Good use of diagrams. Need to have page numbers for references eg page 7 Gattorna (2010). Add more detail in conclusion section about future research suggestions.

ANZAM '11

THE ANNUAL CONFERENCE OF THE AUSTRALIA AND
NEW ZEALAND ACADEMY OF MANAGEMENT

9th ANZAM Operations, Supply Chain and Services Management Symposium

Deakin University, Geelong, Australia
Wednesday 15 – Friday 17, 2011

Abstracts of
Conference Papers &
Poster Session

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WELCOME

Welcome to the 9th ANZAM Operations, Supply Chain and Services Management Symposium 2010 hosted and sponsored by the Deakin Graduate School of Business, (Deakin University).

The theme of this Symposium is "The role of operations management in delivering business performance". Operations management and supply chain performance have become cornerstones of management success particularly for firm's competing in the international marketplace. With increased technology and political changes occurring in both the domestic and global environment the way a firm manages their operations is the key to their success. The primary focus for most companies in delivering better business performance is to understand the drivers and influencers of their supply chain. Businesses that have a focus on superior service that results in increased business performance are likely to perform better than those without this strategy. A company's ability to adapt and innovate its operations will result in it achieving superior growth and profit margins. For many companies achieving better business performance may be reflected in their supply chain partners that have flexible and cooperative working arrangements. The focus of this symposium is on the role of operations management in delivering business performance.

These are the abstracts of the papers that were accepted for presentation for both refereed and non-refereed streams of the 8th ANZAM Operations, Supply Chain and Services Management Symposium.

ACKNOWLEDGEMENTS

The Symposium Organising Committee gratefully acknowledges the support of the Anzam Secretariat in Promoting the symposium.

We wish to thank the participants, paper presenters, session chairs and panellists for their participation in the symposium. We would also like to thank all the reviewers who assisted in the review process.

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Last, but not least, the Symposium Organising Committee would like to thank Samantha Hein and Annyce Herbert for their assistance through a range of support tasks including: communicating with all who submitted papers and reviewers; setting up and maintaining the symposium website and liaising on the schedule of tasks.

We hope all delegates enjoy the Symposium program and benefit from the exchange of ideas and face-to-face discussions.

Stuart Orr

Chair

2011 ANZAM Operation, Supply Chain and Services Symposium

SYMPOSIUM ORGANISING COMMITTEE

Stuart Orr – Deakin University

Vanessa Ratten – Deakin University

KEYNOTE SPEAKER

Professor Vinod Singhal, Brady Family Professor of Operations Management, Georgia Institute of Technology, "Supply Chain Risks and Corporate performance: Evidence from Demand-Supply Mismatches".

VENUE

The conference is going to be held at the Deakin Management Centre which is a purpose-built training facility incorporating hotel accommodation, restaurant, bar pool, gym, lounge and conference meeting rooms. The facility is located in a pleasant rural setting with walks and golf driving range.

bar pool

restaurant

conference meeting rooms

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FULL PAPERS