

Dissemination of Academic Research Knowledge to Construction Industry: Insights from Knowledge Management Literature

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Abstract

Academic research in built environment consists of cognitive, affective as well as behavioural components. Existing built environment research does not reveal many encouraging signs of changes in the way that the construction industry and construction research knowledge is exchanged. Different research dissemination mechanisms have at different performance levels in respect to the way they provided for outcome dissemination. However, the effectiveness and the efficiency are claimed to be relatively fewer and under-developed within the construction industry compared to other industries.

The PhD research on which this research paper is based aims to merge academic research with industry development requirements to build a better responsive construction industry. As a preliminary step, this paper reports on the literature findings on the theoretical background of the ways and means of academic research knowledge dissemination to the built environment. The paper also discusses some of the practical and philosophical issues that would need to be considered when transferring academic research to the built environment. In doing so, relevant literature is synthesized to provide a holistic picture of the current knowledge of research knowledge dissemination, by also bringing insights from knowledge transfer literature while highlighting significant gaps in specific areas such as 'academic research and outcome', 'dissemination to construction sector', 'of transfer' and 'pros and cons of the mechanisms' at this initial level of the research.

The paper considers upon the available research knowledge dissemination options in categories such as, write-ups of individual research, collections of written research, e-transfer, public awareness, research related gatherings, collaboration with government and collaboration with industry. Further it analyses the identified mechanisms with reference to their pros and cons in a way which a researcher can make an informed and sensible decisions as to how to proceed on delivering the profound outcome to the interested knowledge clients. The main dimensions of each mechanism are outlined through the synthesis upon merits and de-merits. The paper develops the argument that the use of a single mechanism often could fail in exploring the whole likely receiver base for a particular research outcome. The approach of using multiples is suggested to counteract this weakness and to enhance transfer of academic research knowledge dissemination into built environment.

Key Words: Academic Research, Construction Industry, Dissemination Mechanisms

1.0 Introduction

There are varieties of research produced ranging from more pure research to more applied research. Among these varieties, a broad consensus is present in the literature that successful communication between researchers and research users is crucial for the effective utilization of research in decision-making in policy and practice (Chandanie and Senaratne, 2012). Communication between these researchers, research funders and research users can happen in number of different ways (Alker, 2008). Further research can be used in a number of different contexts: knowledge (contributing to further research); practice; teaching; public policy; and societal. According to Marsh (2010), many are trying to highlight the need to review how research can be more effectively connected to real-world activity and policy setting. Therefore according to Chandanie and Senaratne, (2011), research programs should be judged not just by the quality and quantity of science produced, but by the industry impact and tangible benefit resulting from the research. The changes brought by research will be seen over a long period of time rather than immediately at some points. However, research should focus not only on how to overcome global challenges, but also how to improve individual industries.

Looking into the situation of the construction industry, there are few encouraging signs of changes to the way that construction industry and construction research knowledge exchange operates. In particular, the link between academic research and construction industry practice is under-developed (Abbott, Aouad and Madubuko, 2008). According to Chandanie and Senaratne (2012), despite the growing complaints that the construction industry is slow and less responsive towards innovation, many

researchers and practitioners point out that the way forward for the industry is with effective adoption of innovation. In this regard, research institutions such as universities can play a significant role in conducting research that helps the construction industry to innovate (Blackman and Kennedy, 2009).

The wider research study aims to align academic research with construction industry development requirements. This paper is based on literature findings, which were required in order to fulfil one of the objectives of main study; that is to identify and analyse different research knowledge dissemination mechanisms which transfer research knowledge from research institutions to an industry. The paper highlights several research knowledge dissemination options. Further, it offers an analysis of these identified options, detailing their advantages and disadvantages in a way which a researcher would be helped in making sensible decisions upon dissemination mechanisms to deliver their research outcomes to the construction industry.

2.0 Knowledge Management insights

In the case of dissemination of research knowledge into an industry, it could be better understood through referring to knowledge management literature. This section tries to bring in some established knowledge management insights to help the argument of the researchers in finding proper solutions for the research question.

Universities have always recognised their role as the producers of knowledge through research. According to Blackman and Kennedy (2009), knowledge is complex, subtle and often difficult to recognise or capture while

being inextricably linked with communication. However, this has cemented a perspective on knowledge that is intricately entwined with notions of knowledge as output – codified, objective, and static and transferred through simple channels (Sizer, 2001 cited Blackman and Kennedy, 2009). Further Empson (2001 cited Senaratne and Sexton, 2008) identifies two perspectives of knowledge; ‘knowledge as an asset’ and ‘knowledge as a process’. On the ‘knowledge as an asset’ perspective, knowledge is often viewed as an objectively definable commodity, which can be managed and controlled by certain mechanisms. For ‘knowledge as a process’ viewers, knowledge is a social construct, developed, transmitted and maintained in social situations. Knowledge dissemination is a sub process of knowledge management and it mainly refers to knowledge transfer to wider communities. Dissemination is the interactive process of communicating knowledge to targeted audiences so that it may be used in order to lead change. The challenge is to improve the

accessibility of desired knowledge products by those they are intended to reach. This means ensuring the physical availability of the product to as large a proportion of the target audience as possible and making the product comprehensible to those who receive it (Ordoñez and Serrat, 2009). This has been further highlighted by Davenport and Prusak (1998, cited Senaratne *et al*, 2005), where effective knowledge transfer does not only involve mere transmission, but also absorption. As such, simply initiating the dissemination mechanisms is insufficient. The transfer needs to adopt an end-user perspective. Therefore researchers need to have a proper knowledge dissemination plan. The following section will discuss upon such processes.

3.0 Research Knowledge Dissemination Process

Alker (2008) has come up with the different stages at which, a research could reach in terms of its dissemination capacity.

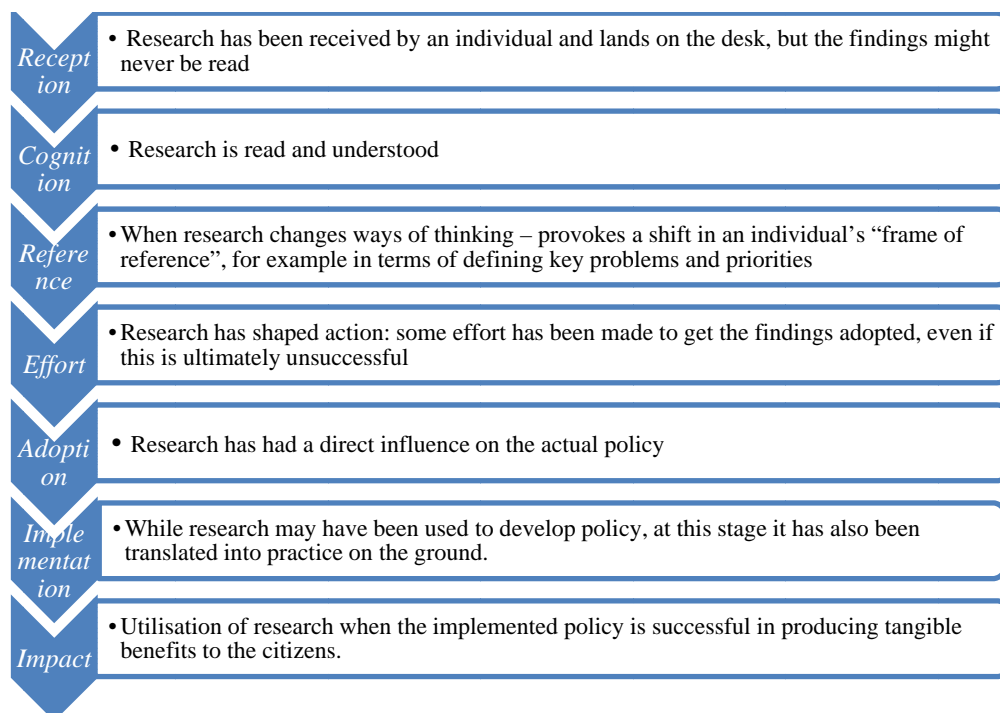


Figure 01 – Chain of utilization (Source: Alker, 2008)

According to Ordoñez and Serrat (2009), efforts to disseminate knowledge products are earnest; however the low impact is mainly attributable to poor planning and the absence of a proper dissemination strategy. In the construction context therefore not much of the research conducted is reaching the lower levels of the above chain.

Central to that is recognition that the dissemination process should be interactive, allowing feedback from audiences according to a cyclical model of communications flow. Therefore Alker (2008) has come up with another model called the pipeline model which explains the different stages of practitioners' use of research.

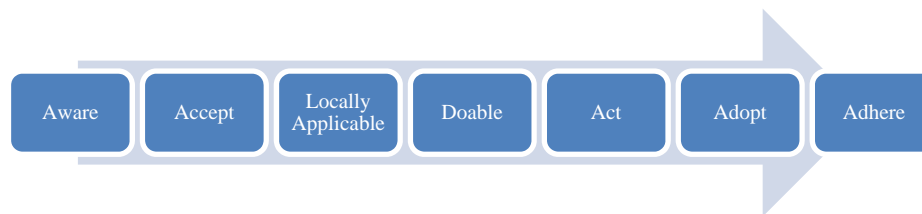


Figure 02 – Pipe line model (Source: Alker,2008)

The pipeline model suggests that research knowledge dissemination could be positioned at seven points starting from awareness to getting adhered to. In between some research outcomes reach the levels, acceptance, local application, accepted as practically feasible, gets in to action and the adoption. As you go deeper in the pipe the success is higher in terms of knowledge dissemination.

However, Alker (2008) has developed the models for water research knowledge dissemination to the particular industry. The situation may be little different in the construction context. However, this provides a good base to start developing such models for the construction industry.

It has to be kept in mind that dissemination can be effective through

different communication channels at different stages and for different purposes. Therefore it is important to look in to available research knowledge dissemination mechanisms.

4.0 Dissemination Mechanisms

“Dissemination mechanisms” here are referred to the different media or types of outputs produced by a research programmes which have the potential to disseminate the knowledge beyond the initiators of the research. According to RD Direct (2009), a research communication strategy can comprise of active as well as passive dissemination activities.

Passive knowledge dissemination is mainly untargeted, including unplanned ad hoc forms of communication, or disseminating (explicit) knowledge through publications in academic journals. Active dissemination is characterised by tailoring research findings to a targeted audience and a dynamic flow of information from the source to increase the uptake of research in policy making. Table 1 below presents some of the common dissemination mechanisms used for research knowledge dissemination. Further, they are categorized into seven groups based on the way of initiation of dissemination mechanism for ease of reference. However, the suitability of each method in the construction context is yet to be established through a field survey that is due. Considering the paper length limits, this paper only presents in-depth

discussions upon above mechanisms based on the categories given.

4.1 Write –ups of individual research

Individual research write-ups are in different forms as indicated in the above table. A research report is a carefully structured write-up. It clearly states the purpose, findings and relevance of the research activity. A report may be written for a range of reasons and for a variety of audiences, therefore its length, style and detail tend to vary greatly (RD Direct, 2009). This is typically read by other researchers. The report provides evidence that the research was conducted soundly.

Working documents, manuals and various publications are also done based on individual researches. Publication is a common mechanism for knowledge dissemination used by many researchers. Further, there are some other mechanisms like brochures, flyers, drawings and presentations which are used to convey research findings. Maqsood, Walker and Finegan (2007) explain the worth of drawings and posters in terms of effective knowledge dissemination. It has been proven that the effect of drawing on memory performance is twice much as without drawing.

Table 01 – Knowledge dissemination mechanisms

Knowledge Dissemination Mechanism		Research References
Write-ups of individual research	Research reports	Alker, 2008
	Working documents	Aouad, Ozorhon and Abbott, 2010
	Manuals	Maqsood, Walker and Finegan, 2007
	Publications	Marsh, 2010
	Others (Brochures, Flyers, Drawings and Posters)	Meek <i>et al</i> , 2009 Ordoñez and Serrat, 2009
Collections of written research	Academic journals	Alker, 2008
	Professional journals	Jain and Nfila, 2011
	Libraries	Ordoñez and Serrat, 2009
E- transfer	Networking	Kanninen and Lemola, 2006
	Internet, intranet and electronic mail	Ordoñez and Serrat, 2009
	Discussion forums	
	Video conferencing	
Public awareness	Promotional campaigns	Ordoñez and Serrat, 2009
	Press releases, TV, Radio	Alker, 2008
Research related gatherings	Conferences	Alker, 2008
	Workshops and seminars	Aouad, Ozorhon and Abbott, 2010
	Training programmes	Kanninen and Lemola, 2006
	CPDs, Lectures and Demonstrations	Ordoñez and Serrat, 2009 Ward, 2003
Collaboration with government	Participating in policy making and Policy Briefs	Alker, 2008 Aouad, Ozorhon and Abbott, 2010
	Partnerships (Public-private, Strategic)	Meek <i>et al</i> , 2009 Ordoñez and Serrat, 2009,
	Official Reports	
Collaboration with industry	Contracts with industry	Alker, 2008
	Products, Services and Consulting	Aouad, Ozorhon and Abbott, 2010
	Knowledge brokers and Simulations	Kanninen and Lemola, 2006 Meek <i>et al</i> , 2009
	Entrepreneurships	Ordoñez and Serrat, 2009
	Practitioners engage in research	Wood, Beckmann and Birney, 2009

Individual research write-ups are strong in content however the problem in these mechanisms is that a greater focus is given to the research itself and not to the audience.

4.2 Collections of written research

Apart from individual write-ups, research outcomes are available in packs. Academic journals, professional journals and libraries would provide the opportunity to access to outcome of many researches at once.

There are number of publishers involved in research publications. For an example, Emerald, alongside other scholarly publishers, is an intermediary or “translator,” capturing, evaluating, organising, and disseminating research output. The scholarly publishing process has been established for centuries and has successfully managed the process of highlighting important research to the wider world, and this has, in turn, contributed to the development of business, science, industry, and culture (Marsh, 2010). A few examples for major journals published by such publishers are; Construction Management and Economics, Engineering, Construction and Architectural Management, International Journal of Project Management, etc.

Moreover, Jain and Nfila (2011) state, libraries and information centres exist to provide access to all types of information, in all different formats, to all individuals to support teaching, learning, research, sharing of knowledge and skills, sharing of information in order to achieve participative democracy and national development.

4.3 E- transfer

E-transferring is a popular mechanism in knowledge dissemination. Networking allows groups of people of different

skills, experience and backgrounds to work together closely without being hindered by the physical distance (Ordoñez and Serrat, 2009). E-mails, internet and intranet are peer to peer applications that allow users to communicate in a fast and effective manner. Discussion forums on the other hand are effective mechanism for capturing and sharing knowledge. Further, multi-media tools such as video conferencing support interactive meetings between knowledge deliverer and capturer.

4.4 Public awareness

The focus here is on ‘dissemination’ and interaction with the ‘general public’. Activities as, open days, scientific fairs, involvement in general press and science journals for the public, involvement in the different media, construction of dissemination and interactive websites etc. can be used as effective mechanisms to disseminate knowledge. Besides these structural investments, some involve themselves in given social and cultural events like expos, urban development projects etc. (Meek, 2009).

4.5 Research related gatherings

Conferences, workshops, professional development gatherings of colleagues are events where participants are able to build on their own personal knowledge through the scientific knowledge that is being disseminated in a conference. At the same time it provides an excellent opportunity to further enhance knowledge being gained through socialisation with other experts and knowledge carriers attending the conference. The picture in Figure 03 is a pictorial representation of the related processes, the values and beliefs that usually exist in the organisation (Ward, 2003).

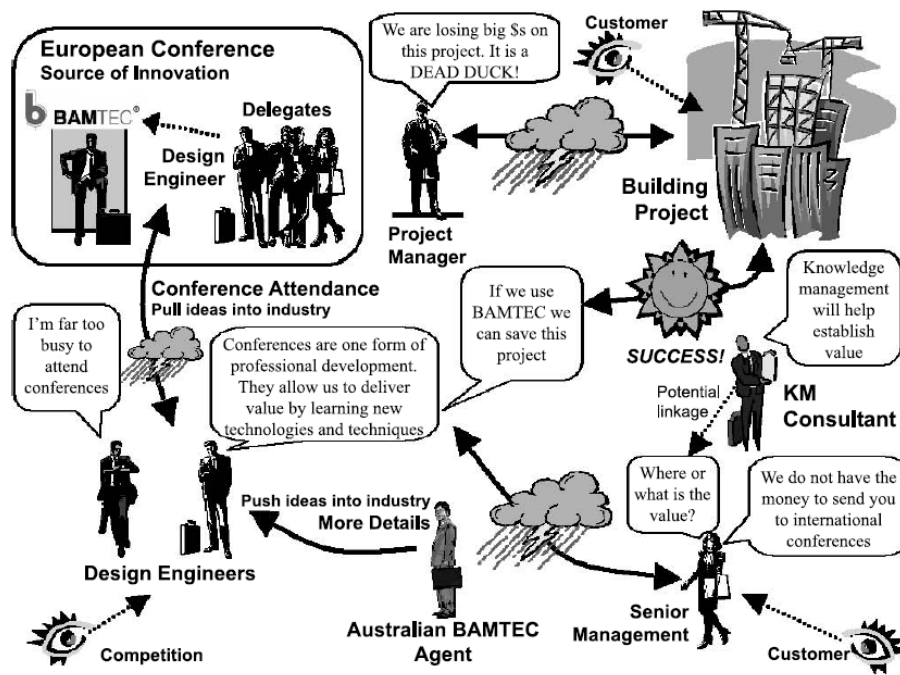


Figure 03 – Knowledge dissemination at conferences (Source: Ward, 2003)

Further, development and promotion of training in innovation as a discipline in its own right is also considered here under this category. Aouad, Ozorhon and Abbott, (2010), suggest familiarity and trust, established through training activities can lead to a better understanding of university capabilities and the consequent identification of a university as a partner in solving pressing business problems.

CPD has been defined by Madden and Mitchell (1993) as the maintenance and enhancement of knowledge expertise and competence of professionals, throughout their careers according to a plan formulated with regard to the needs of the professional, the employer, and society. Many managers belong to professional bodies which seek to encourage or require members to demonstrate evidence of CPD (Jones and Robinson, 1997).

4.6 Collaboration with government

The focus here is the ‘public service’ dimension of research activities. Meek (2009) suggests, it is important to

complement contracts by non-market relations which are often critical in social and cultural dimensions.

Policy briefs, in the form of an executive summary of about five or six pages, are prepared for senior policy makers in Ministries. According to Postlethwaite (2005), these reports present the major findings succinctly and explain, in simple terms, the implications of the findings for future action and/ or policy.

The emergence of public-private research partnerships reflects a fundamental change in the way in which knowledge is generated and applied as well as the changes in approaches to the management of industrial research and development (Howard Partners, 2003 cited Meek, 2009). According to Beath and Siegel (2002 cited Meek, 2009), university-industry partnerships appear to accelerate technological diffusion. It seems that the quality of the relationships and the free flow of information, particularly tacit knowledge, are as important if not more so as the actual commercialization of a research product. Interactive partnerships are becoming

more the norm rather than simple contractual publications.

4.7 Collaboration with industry

Knowledge co-production and circulation to industry happens through contracts with the industry. Increasing the demand for university engagement should be the underpinning activity of an innovation platform (Aouad, Ozorhon and Abbott, 2010). However, several commentators have argued that a major drawback to greater commercialization of university research is the threat it poses to “open science” and academic freedom. However, there has been a growing trend for joint publications between university researchers and those based in industry and government, which appears to have actually increased the significance of the university researchers’ contribution (Meek, 2009).

A knowledge broker is a person or a business that examines disseminated information and knowledge for clients and prepares usable, targeted synthesis for the client. They primarily engage in packaging research results to be easily understood by, and be applicable to decision-makers (Alker, 2008), and also perform the traditional task specific simulations focus on the development of domain specific knowledge. The set of new leadership simulations, however, aim at the development of greater levels of flexibility. That has direct implications for the effectiveness of simulations in training and development (Wood, Beckmann and Birney, 2009). This could be applied into the social research knowledge dissemination as well.

According to Aouad, Ozorhon and Abbott (2010) embedding researchers within companies as part of existing research activity is another method of universities engaging themselves within business contexts and problems. In this way, long-term collaboration is agreed with the recognition that the university

and companies are strategic partners (Meek, 2009). Practitioners engaged in research transfer embodied knowledge in post graduate research activities to the industry through employment. This screens the transfer of competences trained through research to industry (Meek, 2009). Further, Jones and Robinson (1997) state the advantage of knowledge dissemination as an increasing recognition of the contribution which the effective management of human resources can make to enhance the competitive advantage of organizations.

As discussed above, there are a number of dissemination techniques available. But when selecting a dissemination mechanism by an individual researcher it would be better if one can have an overall picture upon the pros and cons of all possible methods. In support to that, Aouad, Ozorhon and Abbott (2010) have come up with mechanism illustrated below, which represents the university involvement ahead of company engagement for several methods. Strategic partnerships have been identified as the method which have the highest involvement from both sides while seminars and such gatherings are positioned at the very bottom.

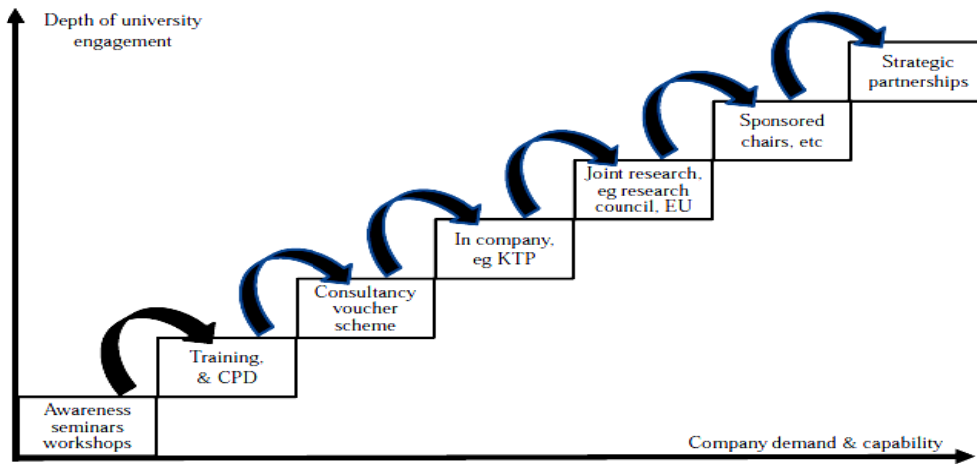


Figure 04 – University–industry involvements in knowledge dissemination mechanisms
(Source: Abbott *et al*, 2010)

In this model, only seven mechanisms were considered. However, there are many other parameters that need to be considered when an individual research is concerned in terms of effectiveness, cost, quality and time when selecting dissemination mechanisms. Therefore,

the table below presents the pros and cons of the dissemination methods which were identified through the research.

Further, the table 03 below presents the pros and cons of each dissemination method by considering them individually.

Table 02 – Dissemination mechanisms: In time, cost quality perspectives

Mechanism	Effectiveness	Time (Researcher's)	Time (Receiver's)	Cost (Researcher's)	Cost (Receiver's)	Quality
Write-ups of individual research	Low	High	High	High	Medium	High
Collections of written research	Medium	Medium	Medium	Medium	High	Medium
E-transfer	High	Medium	Low	Low	Medium	Low
Public awareness	Medium	Medium	Low	Low	Low	Medium
Research related gatherings	Medium	Low	Low	Low	Medium	High
Collaboration with government	High	Medium	Medium	Low	High	High
Collaboration with industry	High	Medium	Medium	Low	High	High

Table 03 – Advantages and disadvantages of different knowledge transfer mechanisms

Mechanism	Advantages	Disadvantages
Write –ups of individual research		
Research report	<ul style="list-style-type: none"> • Provides a single reference point for all aspects of the research • Read by other researchers • Provides evidence that the research was conducted soundly • Easily understandable • Carefully structured • Clearly states the purpose, findings and relevance of research 	<ul style="list-style-type: none"> • Assumes the report is read by a single audience group • May be written in an inaccessible manner • Not widely read by industry people
Working document	<ul style="list-style-type: none"> • May target research findings to particular groups 	<ul style="list-style-type: none"> • Limited access
Manual	<ul style="list-style-type: none"> • Helps translate information into knowledge that can be applied 	<ul style="list-style-type: none"> • Limited audience • Expensive
Publications	<ul style="list-style-type: none"> • Potential impact on a wide audience • Potential to influence development of professionals • Highlights important research • Contributed to the development of business, science, industry, and culture 	<ul style="list-style-type: none"> • Difficulty in accessing key texts in developing countries • Not practice oriented • Possibility of exaggerating or even falsifying research findings to get the work published
Write –ups of individual research		
Others (Brochures, Flyers, Drawings and Posters)	<ul style="list-style-type: none"> • High memory performance 	<ul style="list-style-type: none"> • Needs lot of creativity
Collections of written research		
Academic, refereed journal	<ul style="list-style-type: none"> • Informs the scientific community of findings • Citations lead to wider impacts on intellectual networks 	<ul style="list-style-type: none"> • Limited audience • May be written in an inaccessible manner • Lacks a practical orientation
Professional journal	<ul style="list-style-type: none"> • Reaches the wide practitioner community 	<ul style="list-style-type: none"> • Academic rigor may be lower than that in a referred journal
Libraries	<ul style="list-style-type: none"> • Fulfils the intellectual requirements of the community • Provides access to information to all people without discrimination and censorship • Helps in generate sustained national development 	<ul style="list-style-type: none"> • Time consuming

Mechanism	Advantages	Disadvantages
E- transfer		
Networking	<ul style="list-style-type: none"> • Reaches members who share common interests • Reduces "reinvention of the wheel" Potential for interaction, discussion and review of findings 	<ul style="list-style-type: none"> • Typically low levels of active participation • Requires strong incentives for participation • Time consuming to operate and manage
Internet, intranet and electronic mail	<ul style="list-style-type: none"> • Immediate, convenient • Wide interest in electronic media 	<ul style="list-style-type: none"> • Access to hardware may be limited in developing countries • Potential may be or is temporarily underdeveloped • Expensive
Discussion forums	<ul style="list-style-type: none"> • High impact 	<ul style="list-style-type: none"> • Quality of knowledge is may be at question
Video conferencing	<ul style="list-style-type: none"> • High impact 	<ul style="list-style-type: none"> • Difficulty in gaining access to decision makers • Limited access to hardware • Expense
Public awareness		
Promotional campaigns	<ul style="list-style-type: none"> • Reaches wide audiences 	<ul style="list-style-type: none"> • Core message may be diluted or misinterpreted during the process of popularization
Press releases, TV, Radio	<ul style="list-style-type: none"> • Reaches wide audiences at relatively low cost 	<ul style="list-style-type: none"> • No control over interpretation of Message • Difficult to manage the activity
Research related gatherings		
Conference, workshop, seminar	<ul style="list-style-type: none"> • May allow professionals to learn • More Potential for networking • Participants able to construct own personal knowledge • Translates research results into practical guidance at the community level 	<ul style="list-style-type: none"> • Expense • Time consuming

Mechanism	Advantages	Disadvantages
Research related gatherings		
Training programmes	<ul style="list-style-type: none"> • Familiarity and trust, established through awareness raising • Leads to the better understanding of university capabilities • Identification of a university as a partner in solving pressing business problems 	<ul style="list-style-type: none"> • Funding problems • Difficulties of creating the interest from industry
CPDs, lectures and demonstrations	<ul style="list-style-type: none"> • High impact • Identified by the industry • Can be recorded 	<ul style="list-style-type: none"> • Limited audience • Absence of a coherent CPD policy
Collaboration with government		
Participating in policy making and Policy Briefs	<ul style="list-style-type: none"> • Potential to influence the decision making process • Reports the major findings succinctly • Explains implications of findings in simple terms 	<ul style="list-style-type: none"> • Difficulty in gaining access to decision makers
Partnerships (Public-private, Strategic)	<ul style="list-style-type: none"> • Effective mechanism • No direct cost • Quality is high 	<ul style="list-style-type: none"> • Time consuming
Official Reports	<ul style="list-style-type: none"> • Can create a high impact • Quality output 	<ul style="list-style-type: none"> • Costly for the receiver • Tight time lines
Collaboration with industry		
Contracts with Industry	<ul style="list-style-type: none"> • Knowledge co-production and circulation to industry • Main marker of the attractiveness of universities • Complemented by a “soft” dimension 	<ul style="list-style-type: none"> • Treats “open science” and academic freedom
Products, Services and Consulting	<ul style="list-style-type: none"> • Ensures that knowledge is translatable based on local norms • Improved flow of information and ideas • Closer collaboration between producer and user 	<p>Problems may arise if research agenda of intermediaries is not consistent with the knowledge product</p>
Entrepreneurships	<ul style="list-style-type: none"> • Universities can emerge within business contexts and problems • Long-term collaboration is agreed 	<ul style="list-style-type: none"> • Descriptors are needed to characterise university involvement and support

Mechanism	Advantages	Disadvantages
Collaboration with industry		
knowledge brokers and Simulations	<ul style="list-style-type: none"> • Prepares usable, targeted synthesis for client • Increased communication and engagement • Organizing and managing joint forums for policy-makers and researchers • Building relationship and trust • Setting agendas and common goals • Signalling mutual opportunities • Clarifying information needs • Commissioning synthesis of research of high policy relevance • Packaging research syntheses and facilitating access to evidence • Strengthening capacity for knowledge translation • Communicating and sharing advice • Monitoring impact and know-do gap • Development of domain specific knowledge • Flexibility in the application of knowledge 	<ul style="list-style-type: none"> • Role to be played by those at question • Simulation is not much popular among social researchers as a dissemination mechanism
Practitioners engage in research	<ul style="list-style-type: none"> • Quality output 	<ul style="list-style-type: none"> • Impact would be dependent upon the powers of the researcher • Time consuming • Costly for the researcher

Based on the above tabulated analysis upon each method it could be said that, in individual write-ups the content is high quality but the effectiveness in terms of dissemination is quite low. The collections of research work also provide a better arena for wider knowledge but are marginally high in terms of cost. E-transfer therefore is a good solution for that because of its low cost. However the quality of such outcomes sometimes can be at question. Public awareness mechanisms are another important mechanism to improve the knowledge of the wider community which would create paths for research funding. However, the low level of focus is the major disadvantage. Research related gatherings

are strong in disseminating knowledge to an interested set of knowledge clients. But the lack of interest from industry people due to time and cost constrains hinders the effective dissemination. Collaborations with governments creates a direct access to involvement in decision making which can be identified as an important step in the effective use of knowledge. However, the opportunity is low, as research always takes much longer than politics would allow due to poor governance planning. Collaborations between academia and industry provide a good background conditions for dissemination of knowledge.

However, each method calls for its own format and means of dissemination and includes both proactive and reactive channels—that is, it includes information content that the target audiences have identified as important and information content that the audiences may not know how to request but is likely to be interest in. However, the dissemination techniques are more likely to succeed when packaging and information content is aligned with the target audience.

5.0 Research Knowledge Disseminating Strategy for Construction Industry

Dissemination is only achievable and successful if, from the outset, there is a shared vision and common understanding of what one wants to disseminate together with a way of describing that to those who stand to benefit from it (Ordoñez and Serrat,

2009). It is important to clearly identify the target audience and to map it to one of the categories in the awareness, understanding, and action to be taken. Since target audiences tend to be many, it is best to concentrate on whom, at the very least, needs to be informed, and then prioritize for awareness, understanding, and action. Next, it is essential to think about what benefits the knowledge product will offer. One must then examine the knowledge product and think of how it might be presented as a benefit and solution to users. Moreover, dissemination exercises have milestones that must be identified and set early. Further they must also be realistic.

Therefore it would be helpful to have a dissemination plan for any research from the beginning onwards. Ordoñez and Serrat (2009) have come up with some steps for such a plan as illustrated in the figure below.

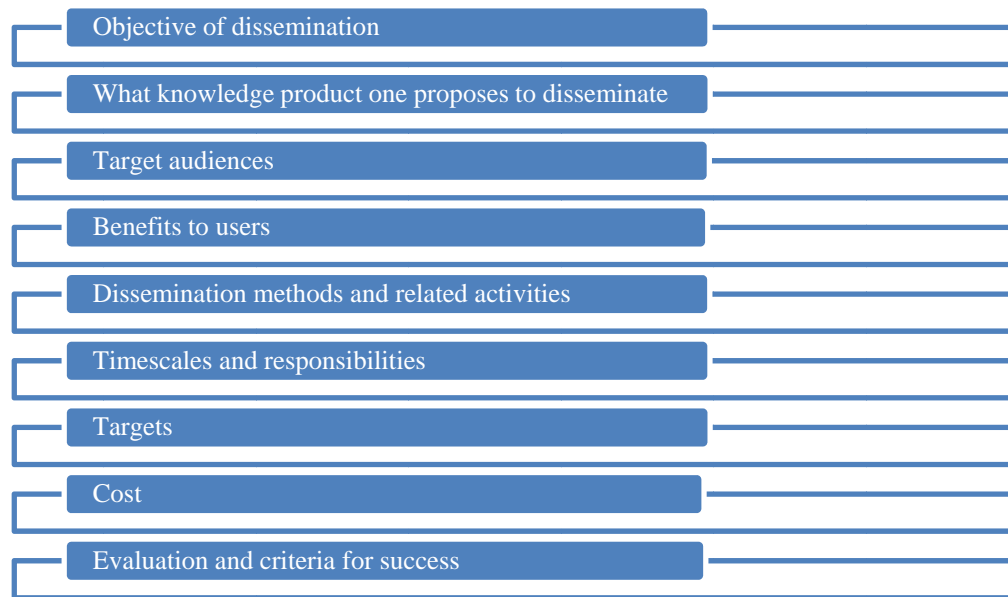


Figure 05 – Steps for a dissemination plan

However the suitability of these steps need to be checked and improved for the Sri Lankan construction industry related research. Once the structure gets finalized it would be better to include it into initial academic research proposals. It would provide researchers

an opportunity to think about knowledge dissemination at the early stages of the research. Further the table below provides some additional actions which could be taken to improve the level of knowledge dissemination between academia and industry.

Table 05 – Characteristics: For Successful Dissemination

Actions to be taken by Academia	Actions to be taken by Industry
Balance the characteristics such as teachability, complexity and specificity of research (Bogers, 2011)	Asking project managers to identify and report on innovation opportunities (Ward, 2003)
Improve trust upon research findings (Bogers, 2011)	Research use included in job-descriptions (Alker, 2008)
Using various dissemination techniques such as written, graphical, electronic, print, broadcast, and verbal media (Ordoñez and Serrat, 2009)	Involve senior management and make them aware of the benefits that external knowledge may bring to the organisation in order for them to budget (Ward, 2003)
Include summary documents (Ordoñez and Serrat, 2009)	Capacity building to access and use research (Alker, 2008)
Letters of thanks to study participants (Ordoñez and Serrat, 2009)	Use as a criterion for staff appraisal (Alker, 2008)
Newsletters to study participants (Ordoñez and Serrat, 2009)	Rewarding research-informed decision-making (Alker, 2008)
Effective quality control to ensure that the information content is accurate, relevant, representative, and timely (Ordoñez and Serrat, 2009)	Arrange a seminar or socialising event where employees returning from a conference with particular knowledge could share and transfer it to other employees (Ward, 2003)
	Framework to decide what are the important ideas and techniques to learn from a client's point of view and from an organisational point view that matches organisational strategy and vision (Ward, 2003)
	Devise selection criteria for rewarding employees by selecting deserving candidates for attending conferences (Ward, 2003)
	Publish, how new knowledge has contributed to improved performance at the personal and/or organisational level so that there is an explicit cause-and-effect link between being open to knowledge-pull and adopting an innovation (Ward, 2003)

However, the suitability and practicality of the above actions still to be checked for the Sri Lankan construction context. But once a proper dissemination is set it would draw on existing capabilities, resources, relationships, and networks to the maximum extent. It also builds the new capabilities, resources, relationships, and networks that the target audience needs. Further, the plan identifies the resources required for implementation. The plan provides a framework for monitoring and evaluation. It explains how one will know that dissemination activities have been successful. If data is to be gathered, it describes how this will be achieved, when, and who will gather it.

6.0 Summary

Academic research in built environment consists of cognitive and affective, as well as behavioural components. There is a broad consensus in the literature that successful communication between researchers and research users is crucial for the effective utilization of research in decision-making in policy and practice. It is argued that academic researchers and the construction industry practitioners do not collaborate closely in the construction sector. The need for sharing knowledge between research institutions and industry has become increasingly evident in recent years. Therefore researchers should look into knowledge management literature to understand the background of dissemination of research knowledge into industry. It was revealed that the efforts to disseminate knowledge products are earnest yet have a low impact due to poor planning and the absence of a dissemination strategy. Therefore the common dissemination mechanisms used for research knowledge dissemination were listed for better analysis. Further, they were categorized into seven groups based on the way of initiation of dissemination mechanism for ease of reference.

When selecting a dissemination mechanism by an individual researcher it would be better if one can have an overall picture of the pros and cons of all possible methods. Therefore the pros and cons of dissemination mechanisms were tabulated and discussed. Finally it was concluded that the dissemination techniques are more likely to succeed when used as packages and information content is aligned with the target audiences. Therefore it would be helpful to have a dissemination plan for any research from start. Further, some additional actions which could be taken to improve the level of knowledge dissemination between academia and industry were also suggested as strategic changes.

7.0 Way Forward

The focus of the PhD research which this paper was based on, therefore is on the merging of research and practice to create a better responsive construction industry in Sri Lanka. Proper research knowledge dissemination therefore will be the key in bridging the academia and industry. Thus merging research and practice is clearly the way forward .

Hence this research aims to explain how to merge academic research and industry development requirements to have a better responsive construction industry practice in Sri Lanka.

In order to achieve this aim, the objectives have been set as follows;

- Explain the nature of research undertaken by construction related academics in Sri Lanka.
- Explain the construction industry development requirements in Sri Lanka.
- Study the current link between academic research and industry practice with the reasons for existing gaps.

- Develop guidelines to merge academic research with industry development requirements.

The aim with these objectives will be explored through a “mixed research method.” As Cresswell (2006) explains, its central premise is that the use of quantitative and qualitative approaches in combination provides a better understanding of research problems than one approach alone. Surveys will form a part of the mixed method which will be followed here, which is discussed by Fowler (2008) as a method with the purpose to produce statistics, that is, quantitative or numerical descriptions about some aspects of the study population. In order to meet the first two objectives therefore two opinion surveys will be carried out. According to Yin (1994), case study is an in-depth inquiry in its real setting that offers an explanation, exploration or description based on the case study actors, when the boundaries between the phenomenon and the context cannot be separated. Hence, a case study will be followed to achieve the third objective of the research together with an action research component. Based on the findings of the first three objectives, the final objective will be achieved at the end. Data which are to be collected based on this mixed method will be analysed scientifically. Conclusions will be made thereafter with the use of findings and a guideline will be developed to direct researchers and practitioners to create a better responsive construction industry in Sri Lanka.

8.0 References

1. Abbott, C., Aouad, G. and Madubuko, L. (2008). *An innovation platform for construction, NWUA pilot project to develop innovation platforms in non-science research disciplines*, Salford Centre for Research & Innovation, University of Salford, Salford.
2. Alker, M. (2008). *Guidance note on transferring research knowledge in to action*, Coordinating European water research for poverty reduction.
3. Blackman, D. and Kennedy, M., (2009). Knowledge management and effective university governance. *Journal of knowledge management*, 13, 547-563.
4. Bogers, M., (2011). The open innovation paradox: Knowledge sharing and protection in R&D collaborations. *European journal of innovation management*, 14(1), 93-117.
5. Chandanie, H. and Senaratne, S., (2011), “A Literature Synthesis: Merging Academic Research and Industry Development Requirements for a Better Responsive Construction Sector”, In the Proceedings of the *15th Pacific Association of Quantity Surveyors Conference*, Jointly organized by Institute of Quantity Surveyors Sri Lanka (IQSSL), Sri Lanka and Building Economics and Management Research Unit, University of Moratuwa, Sri Lanka (BEMRU) on 25th and 26th July 2011 at Cinnamon Grand, Colombo, Sri Lanka.
6. Chandanie, H. and Senaratne, S., (2012), “A Literature Synthesis: Is Construction Industry Low Responsive to Change and Development?”, In the Proceedings of the *World Construction Conference 2012*, Jointly organized by Ceylon Institute of Builders (CIOB), International Council for Research and Innovation in Building and Construction (CIB) and Building Economics and Management Research Unit, University of Moratuwa, Sri Lanka (BEMRU) on 29th and 30th June 2012 at Cinnamon Grand, Colombo, Sri Lanka.

7. Cresswell, J.W., (2006). *Understanding mixed method research*. Thousand Oaks, CA: Sage.
8. Fowler, J.W., (2008). *Survey research method (Apply social research methods)*. 4th ed. SAGE Publications: California.
9. Jain, P. and Nfila, R.B., (2011). Developing strategic partnerships for national development: a case of Botswana. *Library review*, 60, 10-24.
10. Jones, N. and Robinson, G., (1997). Do organizations manage continuing professional development?. *Journal of management*, 16, 197-207.
11. Kanninen, S. and Lemola, T., (2006). *Methods for evaluating basic research funding*. Academy of Finland, Finland.
12. Madden, C.A. and Mitchell, C.A., (1993). *Professions, Standards and Competence: a Survey of Continuing Education for the Professions*, University of Bristol, Bristol.
13. Maqsood, T., Walker, D., and Finegan, A.D., (2007). Facilitating knowledge pull to deliver innovation through knowledge management. *Engineering, construction and architectural management*, 14 (1), 94-109.
14. Marsh, R., (2010). Measuring the impact of research. *Engineering, Construction and Architectural Management*, 17, 10 (1).
15. Meak, V., L., Teichler, U. and Kerney, M.L., (2009): *Higher education research and innovation: Changing dynamics*. International Centre for Higher Education Research, UNESCO.
16. Ordoñez, M. and Serrat, O., (2009). *Introduction to research and research method*. UK: University of Bradford.
17. Senaratne, S., Kagioglou, M., Amaratunga, D., Baldry, D., Aouad, G. and Bowden, A., (2005). Research knowledge transfer into teaching in the built environment. *Engineering, construction and architectural management*, 12, 587-600.
18. Senaratne, S. and Sexton, M.G., (2008). Managing construction project change: a knowledge management perspective. *Construction management and economics*, 26, 1303-1311.
19. RD Direct, 2009. Research process flowchart, NIHR RDInfo. UK: Leads.
20. Postlethwaite, T.N., (2005). Educational research: some basic concepts and terminology. Ross, K.N., (ed). *Quantitative research methods in educational planning*. UNESCO International Institute for Educational Planning.
21. Ward, P.L., (2003). Continuous professional development and workplace learning 4: Conferences, wonderful conferences. *Library Management*, 24 (6/7), 367-369.
22. Wood, R. E., Beckmann, J.F. and Birney, D.P., 2009. Simulations, learning and real world capabilities. *Education + training*, 51, 491-510.
23. Yin, R. (1994). *Case study research: Design and methods*. 2nd ed. Thousand Oaks, CA: Sage Publishing.