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This is the published version of the paper Evans, R.D., Souri, M.S., Wang, G. and Zammit, J.P. 2016. Four-view analysis of the perceived organisational changes required to implement micro-blogging during product conceptualisation for capturing consumer conversations. *International Conference on Digital Enterprise Technology.* Nanjing, China, 29 to 31 Mar 2016, Elsevier. It is available at

https://dx.doi.org/10.1016/j.procir.2016.10.079.

9th International Conference on Digital Enterprise Technology - DET 2016 – "Intelligent Manufacturing in the Knowledge Economy Era

Four-view analysis of the perceived organisational changes required to implement micro-blogging during product conceptualisation for capturing consumer conversations

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Abstract

Global manufacturing output continues to grow, creating the need for the development of new products and innovative enhancements to existing ranges. With the advancement of consumer social media sites, such as Facebook and Twitter.com, companies today are able to search for and utilise knowledge shared in online consumer conversations. Product designers may benefit from these discussions, which often focus on concerns, new ideas and/or product enhancements, thereby enriching the innovative process of New Product Development (NPD). The Web 2.0-based activity of micro-blogging has been researched widely, with scholars identifying both benefits and weaknesses for its use in general business activities. However, its application, particularly for capturing online consumer conversations for product conceptualisation and idea generation, is limited and rarely acknowledged. This paper aims to address this deficiency in literature, extending the previous research of Evans et al. [1], by examining how micro-blogging sites may be utilised during the product conceptualisation phase of NPD to capture consumer knowledge from micro-blogged conversations. Through the conduction of a face-to-face dual-moderated focus group, with fifteen employees of a small UK-based sports equipment manufacturer, we create a four-view model to identify the perceived organisational, process, personnel and technological changes required to embed micro-blogging into the product conceptualisation phase. Findings suggest that manufacturing companies would welcome the introduction of micro-blogging into NPD and view it as an opportunity to engage on a more personal level with current and potential customers and capture consumer feedback typically uncaptured by formal methods. Certain questions were raised, however, relating to interoperability with current systems, automated processes for content analysis and over reliance on manual engagement by staff members.

1. Introduction

In today's technologically-aware consumer marketplace, the ability to create new products and innovative enhancements to existing ranges is seen as one of the strongest driving forces responsible for the sustained sales of manufactured products. Ever-changing customer needs are now driving companies to introduce new products to their portfolio of offerings more frequently in order to sustain business, improve annual turnover and ultimately continue to exist. In order to introduce new products to the marketplace, manufacturers have incorporated NPD processes into their operational strategy, aimed at developing new concepts more effectively and efficiently; this has been initiated by core business functions which are driven by internal departments, such as finance, marketing, sales and service management *inter alia* [2].

The NPD process is accomplished by following various phases of project definition-based tasks that primarily look at developing the right business opportunity and product concepts to meet potential or existing customer requirements. At the heart of this is the product conceptualisation phase, which is facing numerous challenges that have emanated due to the

dramatic increase of data gathering and interpretation necessary to meet customer needs [3]. In addition, ongoing concept development programmes need to respond to changes in the market place far quicker, creating a need for improved customer insight during conceptualisation and requiring deeper processing of available data from end-users in order to capture real-time information of their changing needs and feedback, based on their interactions with existing products [4].

Nowadays, it is no longer sufficient for internal departments to simply work in cross-functional teams sharing ideas captured from the lessons learnt and experience of previous projects. Manufactures must now engage in real-time conversation with consumers, utilizing current social media tools to communicate with consumers and identify recommended changes and enhancements to existing ranges. It is important for the success of any new product development programme that end-user data and other business requirements are incorporated into its early stages [5]; Figure 1 illustrates the information capturing process of the three main requirements needed at the early stages of product development; these include 1) Data gathering, 2) Data and analysis and 3) Data appropriation. These three stages form the process of capturing the front end of the requirements in a product development programme that can be referred to as the requirement capture phase [6].
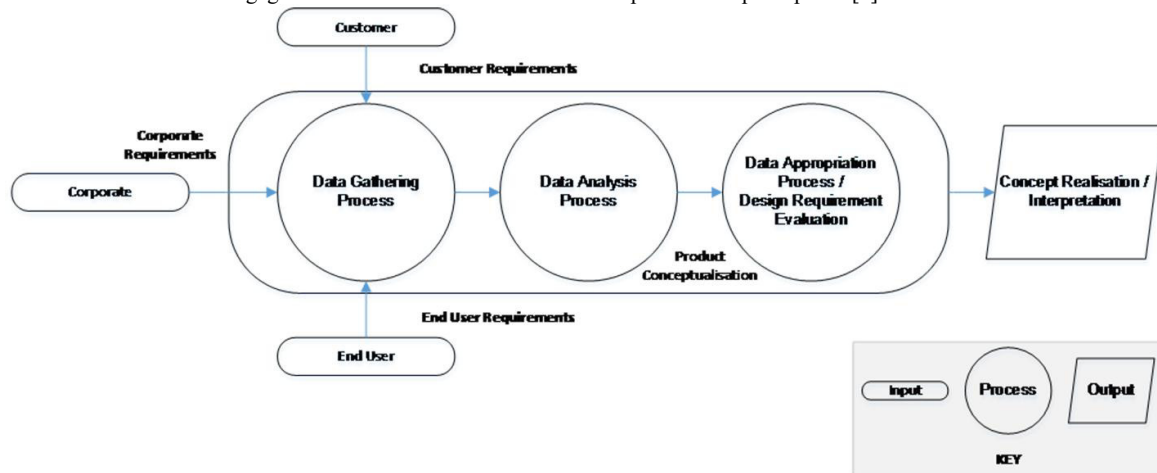

Fig. 1. Product Conceptualisation Process.

During the requirement capture phase, activities include gathering customer requirements, identification of commercial and project planning requirements, business risk assessment, capability analysis and the creation of a concept strategy *inter alia*. Employees who are tasked with completing this phase are dependent on industry setting e.g. in a system integrator organisation, the requirement capture project team may consist of a sales manager, programme manager, project manager, planners, schedulers and co-ordinators. Specialist contractors will also be involved in the delivery of this phase, including those employed to carry out qualification strategies, regulation approvals and software integration.

Activities carried out during this phase are supported by numerous collaboration Knowledge Management (KM), and product lifecycle management tools, which aid the flow of information between team members and assist in the management of product information.

Throughout the requirement capture phase, a high level of creativity and expertise in product realisation is required and seen as a critical enabler for establishing more specific design and engineering processes later on in the NPD process. An additional factor that is seen to enable the success of a new product is understanding consumer requirements [7, 8].

Many academics and software companies today are carrying out multi-disciplinary studies aimed at understanding the specific benefits gained from involving end-users in the earlier stages of a PD programme [9], particularly during product conceptualisation [10]. For example, in the consumer electronics market, Dell Corporation are currently utilising discussion boards to crowdsource consumer ideas and/or amendments in relation to existing and future product ranges. As can be seen in Figure 2, the company is able to informally interact with consumers, identify customer needs and gauge interest on proposed ideas submitted by registered users. Once an idea for a new or enhanced product or service has been submitted, other users are then able to promote, demote and comment on suggestions, which in-turn could lead to enhanced concepts and more informed products.
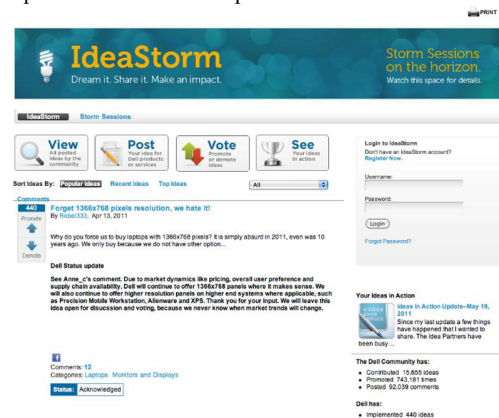

Fig. 2. Dell's IdeaStorm User Discussion Board [11]

Within the manufacturing sector, the task of Crowdsourcing Consumer Conversations (CCC) for the development of products is being explored by numerous academics and Enterprise 2.0 companies, including Innocentive, NineSigma and Hypios. At present, however, the majority of literature relating to CCC has explored it from a problem solving standpoint. Staffelbach et al. [12], for example, examined the use of crowdsourcing to recruit online participants for the solving of complex civil engineering problems, while Lee et al. [13] explored the feasibility of adopting crowdsourcing to enhance problem solving through task design.

At present, research relating to CCC for product conceptualisation is limited. From a case study perspective, Ozkan [14] examined the role of open innovation at P&G to crowdsource ideas from people outside of the organisation. Flores et al. [15] proposed an information-based software framework which explored the concept of integrating outside-in or inbound knowledge, which aims to capture knowledge, ideas, concepts or technologies from external sources, including customers. Conversely, they also explored the concept of outside-in innovation, which disseminates internally-generated ideas and concepts to the external community for further involvement. From a consumer review point of view, Xiao, Wei and Dong [16] developed an econometric preference measurement model, which aimed to crowdsource consumer preferences based on comments submitted to product review websites; this in-turn could then be used to feedback into the product re-design process. Finally, Lee and Dolen [17] explored the role of collective sentiment in online consumer communities to assist with product innovation.

The use of micro-blogging in the manufacturing industry is still in its infancy, with limited research being identified relating to its use for crowdsourcing consumer conversations [18]. Research relating to CCC from micro-blogged discussions appears to be developing in the fields of information systems and design science, but has received little attention in publicised manufacturing literature; this is supported by Wang et al. [19] who concluded that "micro-blogging as a crowdsourcing mechanism hasn't received much attention in previous studies", but that there is "clear potential for it". Ehrlich and Shami [20] added that "micro-blogging has generated a lot of research interest in the public domain, but very little is known yet of how employees may make better use of it".

With the continued development and utilization of micro-blogging, it is believed that companies are now able to communicate far easier with customers. Consumer communication channels, such as micro-blogging, enable manufacturers to discuss and capture ideas conversed by current and potential customers relating to existing product ranges, which may be utilised to enhance the product conceptualisation process. For this reason, this paper explores the use of micro-blogging to CCC found within micro-blogged conversations. We aim to extend the research previously produced by Evans et al. [1], by exploring the perceived organisational changes which would be required if manufacturing companies were to employ micro-blogging for crowdsourcing open-innovation ideas from online consumers.

2. Method

In order to determine the perceived organisational changes which would be required to implement micro-blogging as a customer knowledge capturing tool, we conducted a 1.5 hour focus group with fifteen employees of a UK-based sports equipment manufacturer. All interviewees held between 2-10 years manufacturing engineering experience and aged between 18-40 years of age. The sample of interviewees were as follows: 1 x Head of Product Management, 1 x Head of Information Services, 4 x Product Design Engineers, 2 x Project Managers, 1 x Customers Services Manager, 3 x First Line Customer Service Advisers, 2 x Product Testing Managers, 1 x Product Quality Manager.

While other qualitative research methods, such as face-to-face interviews and online surveys have been used in previous studies to determine organisational views, the authors chose a dual-moderated focus group approach as it allowed for greater discussion and clarification of points raised. Detailed responses were able to be recorded from differing viewpoints dependent on employee position. Furthermore, by hosting the meeting in a 1.5 hour time slot, employees of the collaborating company confirmed that they were able to dedicate more time to discussions in a focus group, rather than viewing the research request as a burden on their current workload.

The focus group was held in October 2015 at the collaborating company's head office. The environment for the meeting was comfortable; the room was air conditioned with one windows facing outside. All participants were seated in non-designated chairs and offered refreshments prior to the meeting commencing. Participants were not permitted to bring in paper, writing material or notes to the focus group meeting, meaning they were free from possible distractions; however, mobile phones were allowed in case of important calls only. Before commencement of the meeting, participants were informed of the purpose of the meeting and that their responses would remain anonymous. Finally, participants were given the opportunity to ask any questions.

In total, 17 people were present during the group meeting, including the author, who acted as mentor to the discussions, and one postgraduate research student who acted as note taker to discussions. The meeting was semi-structured, following a series of 8 open-ended questions, which aimed to elicit comments relating to changes required to implement micro-blogging into the product conceptualisation phase. Questions asked during interview were:

- How do you currently identify, capture and utilise online consumer feedback?
- What do you see as the main benefits of incorporating micro-blogging into the product conceptualisation phase?
- What problems do you see arising if you were to integrate micro-blogging into product conceptualisation?
- What tools or system integration would need to be put in place to allow you to utilise micro-blogging?
- What costs to do you believe would be associated with the implementation of micro-blogging? In terms of financial, recruitment and IT system costs.

- Which employee roles do you believe would need to be revised in order to successfully implement micro-blogging into product development?
- Do current employees currently have the skills and knowledge required to use micro-blogging sites and to analyse conversations captured?
- If your company chose not to use micro-blogging for capturing consumer feedback and ideas, what method would you see as most effective?

3. Results

3.1. How do you currently identify, capture and utilise online consumer feedback?

Interviewees identified numerous methods currently used to identify and capture customer feedback following completion of sale. Firstly, e-mailed surveys are sent to customers within three days of purchase to gain initial feedback on the use of equipment purchased; questions are included aimed at eliciting required or desired product enhancements. Incentivized competitions are held periodically, typically around the holiday season, offering current customers monetary vouchers in return for the completion of lengthy questionnaires based on product experiences. As a quantitative method, internet-based polls are employed on the company's e-commerce website to gather perceived views on individual products; polls are recorded against a 5-point likert scale. Finally, all agreed that the company was beginning to make greater use of social media with Twitter, Facebook and Youtube accounts recently being created. The company's customer services manager stated "it's very hard to continuously communicate with people on social media… people are wanting to chat and ask questions all the time...we do not have a dedicated social media manager to engage in this type of communication".

3.2. What do you see as the main benefits of incorporating micro-blogging into the product conceptualisation phase?

All Interviewees concurred that the main benefit of using micro-blogging during product conceptualisation would be the ability "to keep in touch with customers and discuss problems relating to existing products". One respondent viewed micro-blogging solely as a brand awareness tool, while another saw it as a marketing tool to sell physical products and engage with consumers on a more informal basis. Product design engineers agreed that "it would allow us to gather customer feedback which we could use in future products", while one interviewee commented on the "free" cost of using Twitter, meaning that both customers and company would not incur a cost. Following this comment, one customer service advisor questioned whether micro-blogging would reduce the need for telephone support, suggesting that jobs may be at risk if the organisation moved towards a more web-based customer service platform. Finally, one interviewee added "it is easy to use…I use Twitter with friends and can see the customer engagement potential".

3.3. What problems do you see arising if you were to integrate micro-blogging into product conceptualisation?

Respondents raised numerous concerns relating to the use of micro-blogging during product conceptualisation. Two interviewees commented on the character restriction employed by most micro-blogging tools (usually 140) stating "customers may get frustrated if they were trying to leave lengthy feedback on a product". From an internal perspective, all agreed that there was no identifiable person whom could manage the micro-blogging account and that a person may need to be recruited or skillfully developed in order to take on added responsibilities. The company's Head of Product Management questioned the intellectual property rights of captured feedback and ideas, asking "who owns the idea once a customer supplies it?", while one respondent added "not all our customers use micro-blogging sites. Most use e-mail." Finally, several interviewees questioned the process of fault finding, questioning whom within the organisation would hold this responsibility, stating "we won't have the time or resources to trawl through customer conversations; this will need to be an automated process".

3.4. What tools or system integration would need to be put in place to allow you to utilise micro-blogging?

All interviewees agreed that Twitter or an alternative micro-blogging account would need to be chosen before utilisation. One interviewee questioned whether the selected tool could provide a feed into the Microsoft Sharepoint tool currently used by the company, stating "wouldn't this become yet another tool for communication?"; following this statement, all agreed that integration or a feed from the micro-blogging site into current IT systems would be beneficial instead of having to have simultaneous tabs/systems open. One respondent added "it would be great if important feedback or comments could be delivered to our e-mail account", while one interviewee responded stating "we would require an individual to manage the micro-blogging account". Finally, one argued that if an automated process was created for fault finding and content analysis, "we wouldn't need additional staff".

3.5. What costs to do you believe would be associated with the implementation of micro-blogging? In terms of financial, recruitment and IT system costs.

Interviewees concurred that staff training would need to be provided by an external provider on how to use the selected micro-blogging tool. One respondent added "we would either need to employ someone to manage our account or incorporate the responsibility into another person's role". The company's Customer services manager added "if a person needed to be recruited, we would incur recruitment costs, salary expenses and potentially require greater office space". One respondent commented "Twitter is free, which is a plus, although it would cost a lot in man hours to have someone trawl through customer tweets to capture an important comment if it wasn't an automated process". The company's Head of Information Services added "I would like to see ROI figures to determine

438   *Richard David Evans et al. / Procedia CIRP 56 (2016) 434 – 439*

the benefit of using such a tool". Finally, two project managers questioned "would team members need to have iPads to continuously communicate with customers?"

3.6. Which employee roles do you believe would need to be revised in order to successfully implement micro-blogging into product development?

Employees agreed that either a new member of staff would need to be recruited to manage the micro-blogging account or current members of staff working in either the customer service or product design teams would need to be developed in skill to manage additional responsibilities. Two representatives from the company's first line support team stated "we would be willing to manage the account if it was incorporated into our workload". Following this comment, one product design engineer added "if technical feedback was provided, how would customer service employees know what to record? How would this then be fed back to us in product design?" Following this comment, questions were asked relating to the potential for an automated process whereby faults found could be automatically sent to the company's lessons learnt system. Finally, all agreed that training would need to be provided on writing styles for informal micro-blogging conversations stating that "it'll be hard to chat to customers with only 140 characters".

3.7. Do current employees currently have the skills and knowledge required to use micro-blogging sites and to analyse conversations captured?

Twelve of the fifteen employees interviewed stated that they use Twitter in their personal lives, with 8 stating that they use it on a daily basis. All agreed, however, that they would be unable to conduct targeted searches for consumer conversations relating to current products and would require a more automated process, agreeing that "customers talk about our products on social media all the time, we don't have the time to continuously search for new conversations". Two respondents commented that if content was captured, they would have the ability to analyse its content and identify critical feedback which needed addressing and could be fed to product design engineers. Interviewees agreed that the preference would be that content be captured and analysed automatically and then distributed to relevant employee e-mails. Finally, two interviewees commented that staff would require training on writing well written responses which meet the character limitation of the chosen micro-blogging site.

3.8. If your company chose not to use micro-blogging for capturing consumer feedback and ideas, what method would you see as most effective?

The majority of respondents agreed that incentivized surveys would be seen as most beneficial for capturing feedback from consumers. Two respondents stated that focus groups with existing customers would solicit quality ideas on future products. All agreed that social media tools, including micro-blogging, offers the possibility to capture a greater

geographical dispersion of feedback than with more traditional methods; however, their integration would require staff training or the employment of an additional staff member.

Following the analysis of results obtained from the focus group meeting, a four-view analysis model was created. Respondent views were examined to categorise suggested changes required to successfully implement micro-blogging into the product conceptualisation phase of NPD.

4. Four-View Analysis

The four-view model, presented in Figure 3, shows the four key areas of Organisation, Processes, People and Technology, which must be considered if manufacturing companies were to utilise the knowledge discussed in micro-blogged consumer conversations for improving innovation during the product conceptualisation phase of new product development.
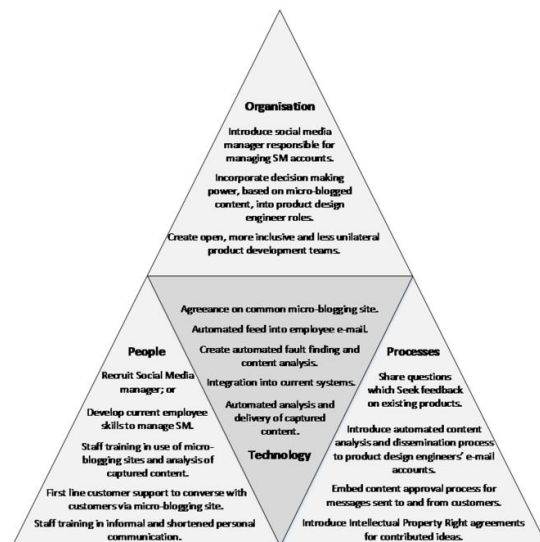

Fig. 3. Four-View Model based on Focus Group Responses

As may be seen, with regard to changes required to organisational structures and role responsibilities, the company's preference would be to employ a new member of staff with the responsibility of managing all social media accounts, including the chosen micro-blogging site. Decision making authority would be given to product design engineers to incorporate suggestions from consumer conversations into new or enhanced product designs. Respondents agreed that a more 'open' and 'inclusive' working culture would need to be embedded into product development so that ideas from the micro-blogging site may be considered more fully.

With regards to process changes required to implement micro-blogging successfully, company employees must begin to share open-ended questions with online consumers to elicit suggestions or improvement ideas for new or existing products. An automated approval process should be established to encourage free flowing consumer-organisation conversations, while an automated analysis mechanism should be introduced to decipher important content in consumer conversations; this

should then be circulated to relevant employee e-mail accounts. Finally, interviewees agreed that consideration should be given to the intellectual property rights of ideas captured from micro-blogged conversations; this would potentially require a new sub-process to be embedded into the PD process.

In terms of changes required to the people involved in the micro-blogging activity, a new member of staff should be considered to be solely responsible for managing the company's social media accounts. If not possible, the company should provide external training to develop the current skills of employees in order to manage the micro-blogging site; this training should include lessons on how to analyse and disseminate captured content, as well as training on how to write well-written and short, character limited responses to conversations. Finally, consideration should be given to providing responsibility of micro-blogged consumer conversations to the company's first line customer support. However, this must be added to current employee workloads and sufficient technical training provided.

Finally, in relation to the technology changes required to adopt micro-blogging, there must be a corporate agreeance on a chosen micro-blogging tool. As mentioned previously, there should also be an automated feed of important conversations to relevant employee e-mail accounts. Efforts should be made to integrate the chosen micro-blogging tool into current IT systems to save employees from having to navigate between multiple pages/systems. Finally, an automated feature for analysing content and faults should be created to save on time.

5. Conclusions

This paper has added to existing literature on the exploration of micro-blogging within the manufacturing industry. A four-view model is presented, following the conduction of a dual-moderated focus group with fifteen employees of a UK-based sports manufacturer, to understand the perceived organisational changes required if micro-blogging was to be integrated into the product conceptualisation phase for crowdsourcing consumer conversations on micro-blogging sites.

It is evident from our findings that micro-blogging is still viewed predominantly as a marketing tool for engaging with potential and existing customers. However, numerous opportunities were expressed, including the ability to capture ideas for product enhancements and identify faults in existing product ranges. Concerns were also raised, however, relating to the integration of micro-blogging into current systems and the potential impossibility of having an automated process for content and fault analysis, resulting in additional search-hours being added to staff workloads.

5.1. Future Work

In future, research should consider automation methods for analysing content and faults identified on micro-blogging sites. In order to determine the credibility and accuracy of the presented four-view model, a study should be conducted within a real-world new product development environment to understand actual changes required post adoption; this would also identify potential benefits and opportunities. Finally, methods should be explored which determine the return on investment of implementing micro-blogging into the product conceptualisation phase.

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