Exploring the adoption of standardised processes in professional service operations: implementing the acute stroke care 'pathway' in a hospital

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Abstract

This research explores what, if any, are the distinctive characteristics of standard professional healthcare work hindering or supporting the adoption of operations management (OM) initiatives. We utilise concepts and insights from the healthcare OM and routines theory literatures, with the research taking the form of a single in-depth case study of the adoption of a stroke care pathway in a UK hospital. Our findings show that that the implementation of standard work, whilst still a valuable ambition for healthcare improvement, is a multi-dimensional puzzle. We conclude that although pathway implementation took flow dependency as its design logic, failed to recognise other forms of dependencies which impact its performance. Additionally, pathway artefacts (diagrams, software, etc.) can offer a critical insight into a key challenge for 'standard' (and the standardizing of) professional work: individual autonomy.

Keywords: Operations Management, Organisational Routines, Healthcare

Introduction

Compared to manufacturing, the service sector – particularly the healthcare sector – has made limited gains through QI initiatives (Dobrzykowski et al., 2016). One explanation offered in the literature for the failure of hospitals to adopt OM initiatives is that many of these initiatives are normative in nature and difficult to be accepted and used in the complex and uncertain environment of hospitals due in part to the strong professional tradition within healthcare (Dobrzykowski et al., 2016). In this paper we aim to better understand and characterise this "distinct environment for managing operations" with the aim of developing a profound insight into what happens when professionals, with different knowledge, background and skills come together to practice and improve within the context of an OM initiative. The main research question we sought to answer in this work is: *What, if any, are the distinctive characteristics of standard professional healthcare work?*

We utilise concepts and insights from two bodies of literatures, namely healthcare OM and routines theory to investigate the adoption of a particular OM initiative, the acute stroke care pathway. Care pathways are interdisciplinary care plans that summarise the optimal sequencing and timing of interventions for patients with a particular diagnosis, procedure or symptom, (Campbell et al., 1998) aiming to improve efficiency and effectiveness of healthcare practice. On the other hand, healthcare processes when viewed via the lens of

organisational routines consist of two aspects; idealised routines (how different people think things should be or how routines are written on protocol and guidelines, known as the 'ostensive aspect') and the many ways that routines change as they are actually performed (the 'performative aspect'). Understanding processes as routines also suggests that capturing the artefacts of any process (i.e. written rules, procedures, forms, the operating theatre or consulting room layout, 'to-do' lists, etc.) is not sufficient to understand, and subsequently improve them.

As the use of OM practices is increasing in healthcare settings, it is vital to understand the antecedents that promote or inhibit their adoption. Such knowledge can help healthcare professionals and operations managers to design better process and implementation strategies that improve the delivery of care and its operational performance.

Antecedents of OM initiatives adoption in healthcare organisations

Although reducing process variability is a fundamental aim of process management QI initiatives, *uncontrollable variations* exists in most levels of healthcare organisations making this difficult to achieve. The extant content of tasks is not always consistent and patients' conditions are dynamic resulting in highly varied, personalised interactions between patients and the healthcare provider (Shah and Ward, 2007).

The tendency of healthcare professionals to work autonomously has been identified as an obstacle to the adoption of initiatives by many healthcare OM scholars (Tucker, 2007; Grove et al., 2010). Healthcare professionals can decide if it is appropriate to adopt an innovation or not and how to use the innovation (Tucker, 2007). Lewis and Brown (2012) explain "what makes professional employees different is that this body of knowledge is externally (but non-governmentally) regulated and controlled in its content and application" (Harvey, 1990). Scholars that recognise the collective nature of routines, note that there is substantial heterogeneity in individual-level skills and abilities (Feldman and Pentland, 2003) that results in variation between the ostensive and performative aspects. Thus, individuals' heterogeneity in knowledge and skills associated with individual agency, defined as a source of power that is exerted from individuals, influences routine performances (Feldman and Pentland, 2003).

The need to match demand with existing and available capacity is clearly one of the most significant challenges that managers face in any service industry (Tucker, 2007). A number of scholars have noted that the ways in which professionals monitor processes and use of resources influences their collaboration and consequently, the outcome of the project (Stirman et al., 2012; Drubsteen et al., 2016). Drubsteen et al. (2016) studied operational antecedents of integrated cross-departmental planning and found that shared resources hinder the commitment of medical staff in care processes. The organisational emphasis on resource utilisation and the performance requirements of the relevant departments creates a battle between the one which supplies the particular resource, (which is focussed on meeting its own performance targets), and the care delivery department that is need for access to that resource.

Communication and coordination issues were also found to pose additional challenges to the adoption of OM initiatives. Some specific aspects of healthcare processes make information exchange between the healthcare professionals challenging. First, although the flow and the content of the process of treating each patient can be relatively standardised, new tasks are evolved based on individual patients' needs (Nembhard et al., 2009). Secondly, multiple professionals with varying knowledge and skills are involved in the process which makes accurate communication between them challenging (Nembhard et al., 2009). Third, healthcare activities take place in different locations and across staff shifts. Thus handoffs between professionals are important and have been shown to be problematic, inducing considerable variations to the process. These situations comprise the knowledge intensive

and complex nature of healthcare processes and create challenges around coordination and information exchange amongst professionals (Dobrzykowski and Tarafdar, 2015).

Relational resources support communication between professionals, and subsequently, coordination of healthcare processes. To practice routine, individuals need to work in a cooperative and integrated manner, defined as the extent to which communication, coordination and teamwork exist within an organisation (Pagell et al., 2015). Dobrzykowski et al. (2016) in their study note that internal integration "can unlock improved performance for professional service operations" where outcomes are driven by interdependent professionals characterised by high degrees of autonomy and the need to share information to coordinate their work (Dobrzykowski and Tarafdar, 2015; 2016). Relational resources promote the development of professionals' shared language and understanding, encourage risk-taking behaviour and enable members to assimilate each other's knowledge and expertise (Fu, 2015).

In addition, the traditional hierarchical organisational and managerial structure of healthcare organisations was also found to influence the coordination of routines creating chaotic situations (Greenhalgh et al., 2008). For example, Edmondson et al. (2001) illustrate how differences in terms of position, authority, and power may influence routine performances through the decisions of participants as to whether to engage in talk and collective reflection on their performances. Some scholars note, that weak performance monitoring system were responsible for the subsequent implementation failure of OM initiative of manufacturing industry origins in healthcare settings. This prevents professionals from evaluating their actions and assess the impact of the new process, thus not being cognisant of resultant improvements to the process, causing a subsequent lack of trust in the process and their own actions (Dionne S. Kringos et al., 2015).

Embedded rules and procedures of the routines in protocols, guidelines, software and other artefactual forms (Pentland and Feldman, 2008) - used by from the professionals to carry their tasks and manage the process, also have an essential role to play in the development and application of processes (D'Adderio, 2008). Van Raak et al. (2008) observed that, due to a lack of coverage of specific steps within a protocol, paramedics practiced differently creating communication issues among them.

Finally, broader contextual environmental factors, such as the regulatory system within which a care pathway is implemented, are also influential in determining the success of OM initiatives. Grove et al. (2010) estimate that, in the setting within which they conducted their study, there were three hundred governmental targets to be met by hospital managers result in 'gaming', – the manipulation of data from professionals to report good outcomes while hiding real performance – as identified in their study.

Therefore, although OM has succeeded as a field, there is yet still much to be learned regarding the adoption of process management approaches and as to how this knowledge base can be successfully applied within healthcare organisations.

Study Context and Methodology

The research was carried out in a medium-sized UK hospital (565 beds, approx. 5000 staff). Our unit of analysis is the acute stroke care pathway. We chose to focus on acute stroke care partly because stroke is the third most common cause of death and of complex disability in the UK and worldwide. Moreover, the acute stroke care pathway was selected because stroke patients are relatively inactive in the process, which allows us to capture variability factors related to systems and processes.

Stroke care is consisted from five key stages: patients arrive to the hospital by ambulance or by own means from home or as general practice (GP) referrals, they receive an initial assessment in emergency department (ED), have a diagnostic computerised tomography (CT scan) in the radiology department (RD), then return back to ED where a decision on their

diagnosis and treatment plan is made. Finally, if they are diagnosed with stroke they are admitted to an acute stroke unit (ASU) to receive further specialised stroke care. Several professionals located in these groups participate in the process. Figure 1 summarises the five key stages of the 'official' stroke care pathway. This diagrammatic representation highlights how the pathway crosses organisational and spatial boundaries. The care process moves through a chronological order from top to the bottom.

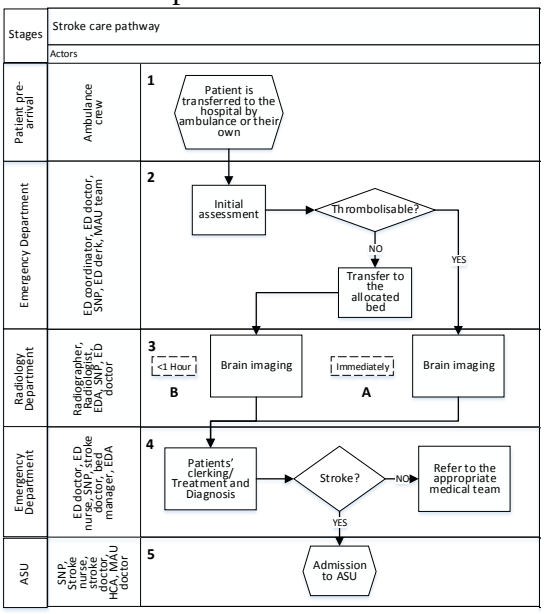

Figure 1: Stroke pathway at the hospital of study

Data collection and analysis

Our research is based on four data sources: semi-structured interviews, non-participant observations, archival documents and secondary individual patient data. Data were collected during an eleven-month period, from March 2015 to February 2016 and the process was divided in five different phases.

In the first phase we conducted 15 interviews to familiarise ourselves with the stroke care process and the role of everyone in it. The interviews were all recorded and typicall lasted 30-45 minutes on average, were loosely structured using a topic guide that covered: ideal stroke care process, causal factors of its variation, and suggestions for improvement options. Additionally, we analysed several formal and informal process documents and non-participant observations. In the second phase, we combined all of the collected data and developed a first draft of a detailed process map, using a horizontal swim lane flow chart. We followed this up, in the third phase, by conducting 8 interviews with medical staff to evaluate this process map and in parallel, we continued conducting non-participant observations. Field observations took place across several locations, including the ED, the ASU, RD and the emergency medical assessment unit (MAU).

In the fourth phase, we conducted an additional 19 semi-structured interviews. These interviews followed the framework of a modified Sequential Incident Technique (SIT) which has been used in the literature to unravel irregularities, limitations and bottlenecks associated with a process (Stauss and Weinlich, 1997). We used the process map that was developed in the previous phases- walking through this with the participants, noting any stated variations to it, and the main causal factors and issues behind variations. Participants were also asked to describe in detail any specific incident, when possible, to illustrate their statements. And, at the last, fifth stage, we organised a workshop inviting all care professionals involved in the pathway (16 attended). The attendance of 16 people in total comprised of several practitioners involved in the process. The whole workshop lasted one and a half hours,

beginning with a 30-minute presentation outlining the background, methodology and findings of the study, and followed by an informal discussion between the researcher and the participants for around an hour. During this discussion, the researcher was asked by the participants to clarify and explain some of the findings, and suggestions and ideas for improvement were discussed.

In total our qualitative data collection comprised of 192.5 hours of non-participant observations, 42 formal interviews and detailed documentation of 52 instances of patients following the acute stroke care pathway.

Findings

As anticipated by the literature, we observed significant, continuous variation to the process. Observations highlighted three different types of variations within the five stages undermine pathway operational and organisational performance; unavailability of resources, variations in communication and system failure. The most frequently observed variation in the process was the unavailability of human (i.e. medical staff) and physical resources (i.e. diagnostic tests and beds) required for the stroke care. Such variation was caused by several distinct factors, but was primarily due to communication issues (i.e. failed, delayed or inaccurate information exchange) between the relevant participants: *"Sometimes, ED staff do not inform us. If they do not inform us that there is anybody coming in, we do not know. Then the care process is delayed." (Stroke nurse 1).*

Likewise, because of staff scheduling issues at the hospital. Often capacity of professionals was not enough to meet patient demand: "If there is more than one stroke patient that comes in, there will be a delay. The SNP can only treat one patient at a time."(ED nurse). Professionals, might have been busy administering care to other patients, or having other attendant duties to perform: *"Maybe it has an impact on the smooth running of the department. Because if it is really, really busy and everybody is stretched in different directions you may not be able to get your patient seen by the doctor. The doctor could be doing 2 things at once, so that may cause a delay to the smooth running of the department"(Stoke Nurse2)*

Some of the professionals argue that variation in practitioners' engagement with the process and their prioritisation for the care of other patients, could be explain due to differences in internally or externally defined departmental goals and targets: *"from the ED nurses the comments that you get is that: "You are not the only priority". Which exactly proves that there are multiple priorities. If you look at the GG plan, they have 5 years' plan and then an annual year of plan for 5 priorities to spend money on and stroke keeps falling and is falling." (Stroke Nurse Practitioner 3).*

Variations in the communication of participants both in the exchange of administrative information and communication for cooperation (liaison during decision-making process), were also frequently observed in the process. Some administrative exchange variability is essentially exogenous, driven by the patient/carer/relative being unable or unavailable to provide basic admission and symptom information. Although much of this information is unnecessary, or at least not critical, for treatment, staff being unable to initiate key administrative processes (i.e. request diagnostic tests, etc.) impacted upon practitioner's ability to comply with the official pathway. Professionals might have been busy dealing with the care of other patients and being unable to act in accordance with the communication routines: *"ED staff forget to inform us. I just assume it is pressure and they have so many things they are trying to do…we often forget about communication for all the patients, whether they are trauma or stroke" (Senior Radiologist 1).*

Some of the professionals stated that staffs' competence on stroke care process impacted the efficiency and effectiveness of their communication: *"So, if the patients present by themselves and the receptionist does not recognise that they might have had a stroke then*

there might be a significant delay over there" (Stroke Doctor 2). We observed that due to communication failures, participants needed to communicate in a more frequent manner. This might happen due to a decrease in the accuracy of communication. In transferring the same information to different professionals multiple times, important parts of it may be lost, or forgotten. This potentially impacts patient care and causes medical errors. Similarly, we noted the emergence of different communication mechanisms. For example, when staff were not able to communicate by phone they walked to the other departments to communicate face by face.

The stroke doctors and ED staff were observed having difficulties liaising in deciding for the patients' diagnosis and treatment. The findings of this study illustrate that communication between the ED staff known to have a particular competent stroke care with the stroke team was faster and more effective: "If you have for example somebody like Dr X (ED doctor interested in stroke care) to run this pathway, it is his baby, it is his thing to drive the care of stroke patients. I am sure he is probably better than any of us at getting things done" *(ED doctor 2).* While, when professionals were less competent on stroke their communication on decision making seemed to suffer, creating considerable delays to the care process: "The one (ED senior doctor) today is a very junior registrar and she happens to be excellent, but actually her experience is limited. If she was on duty during the night and had none to confer with, it would be likely that she would be slower because she would want to consider more factors." (ED doctor 1)

Additionally, communication routines for the decision-making process could vary because of artefacts being unavailable to inform and guide the professionals' work: *"We do not have clear defined pathway. And that makes huge difference for the ED staff to know how to practice stroke care" (Stroke Nurse 1).* In the hospital, there was no single, formal documental representation of the stroke care process. Instead there were 8 different versions of it in different forms: 4 flow diagrams, 3 scripts and a combination of script and flow diagram. Each department had their own protocols employed to carry out the work which was viewed as problematic by clinical staff, creating variation in their performances. Problematic relationships between the staff: "*I feel that I have a very different relationship with the bed manager and site manager than a lot of other staff on the ward do.* Because of what I do, they (the bed managers) respond very, very differently to me. And I know this is a concern that my other colleagues have"*(ED nurse)* had an additional impact on the outcome of their collaboration.

Anyhow, variations in the availability of resources and in communication routines of the pathway had a negative impact on the effectiveness and efficiency of the process. For example, process might have broken down (i.e. paused, delayed etc.), formal steps followed in different order and the use of resources was increased.

Discussion

The findings strongly suggests that the core operational challenge associated with implementing a single care pathway (and its specific bundle of actors, activities, interactions, etc.) is calibrating it in such a way that it does not conflict with the hospital's overall care portfolio. Although a care pathway is a singular initiative, implementation takes place within an organisation already comprised of a diverse portfolio of services, defined as the multitude of pathways and a large number of other clinical, operational and administrative activities. Distinctive characteristics of the formal pathway such as geography, illustration of it in artefacts, fragmentation of the capacity and KPIs (Key Performance Indicators) induced misalignment of the pathway and overall hospital portfolio, undermining operational performance.

Geographical interaction

The exchange of both administrative and medical information essential for the coordination of care was more efficient when individuals were located in close proximity within the hospital. The infrastructure of the organisation and, in this case of the pathway, is part of an organisation's structural capital and promotes or constrains information exchange among the professionals (Radaelli et al., 2015). For example, ED nurses would always inform the ED doctors for the arrival of the patient, but will often would not inform the stroke nurses if the latter were not located in ED at that time.

Moreover, georgraphy of the patwhay impacted the knowledge capability of the organisation. Shared knowledge supports staff adaptation to the process. This involves both acquiring knowledge for the process itself and the work of the others involved it, being important for their collaboration. In the hospital the location of professionals and the subsequent interactions between them restricted information exchange important for the development of professionals' shared understanding regarding the stroke care: *"I do not know how they work down there. It is not clear to me like in my department where I know who manages which bed all the time. That might cause issues to the communication because it is not clear with who to communicate" (Stroke Doctor 2).* Similarly, from the perspective of the ED staff who were not stroke specialists, the fact that they were not able to interact frequently with, or observe the practice and outcomes of the stroke doctors' work, restricted their stroke care knowledge development. Particularly, this prevented their learning from the stroke doctors and reflecting on their own practice in order to build confidence and stroke care competencies. When individuals are located in close proximity to each other they are able to observe other colleagues while they carry out their own tasks and subsequently to learn, reflect and improve their practice (Edmondson et al., 2001).

Furthermore, physical proximity between the different practitioner groups also facilitated shared learning and knowledge acquisition through the enablement of a formal and informal collective process of reflection on the pathway, which is another crucial factor in process change (Edmondson et al., 2001). Professionals' were less motivated to attend staff meetings, especially if those were located in considerable distance from their department, due to their workload and difficulties to stop what they were doing. Informal collective reflection processes on pathway performances taking place in social staff gatherings such as coffee breaks etc. supported pathway improvement and adoption.

Interaction with the artefacts

Although formal pathway design embedded in artefactual forms was intended as a coordination mechanism to manage pathway dependencies, failure to capture the practical reality of the organisation within which it was to be implemented resulted in pathway coordination issues and misalignment of the pathway with the overall hospital portfolio. Routines scholars note that the competence of individuals and consequently, the performance of routines, is mediated and essentially transformed by the capabilities of artefacts that they use in their work (D'Adderio, 2008). Heterogeneity of professionals on medical and administrative stroke care knowledge and the absence of sufficiently detailed information within the pathway documents, hampered professionals' ability to effectively and efficiently carry out their tasks.

Fragmentation of capacity

The incompatibility of the formal pathway design with the characteristics of the organisation resulted in conflicting performances, was also demonstrated in a range of concerns around capacity. The formal pathway design suggests a specific provision of resources (i.e. availability of medical staff, CT scan and beds etc.), but in practice hospital resourcing, managed locally, created significant barriers to successful pathway adoption when multiple pathways were integrated. There was a political dimension to resourcing. The emphasis on resource utilization and performance requirements within the departments delivering care

processes created a conflict of interest between the department which supplied the particular resource and the demanding departments' need for the use of the resource (Drupsteen et al., 2016). In the context of this study the ASU team was dependent upon input from the ED and the RD to deliver the stroke care pathway, and consequently was left fighting for the required resources against the prioritisation of multiple other patient groups.

In addition, hospital scheduling system was also another factor that contributed to the discrepancy between patient demand and resources. This is a typical source of artificial variation in the supply of healthcare services (Noon et al., 2003), also this study illustrates. Inevitably, the impact of capacity became even more acute when there was an increase in overall patient demand. Moreover, the findings of this study support the work of other OM scholars who have shown that uncertainty and variability in patient demand inhibits inter-departmental integration (Drupsteen et al., 2016; Radelli et al., 2015). Due to the subsequent increase of professionals' workloads their ability to collaborate was challenged (i.e. the exchange of administrative and medical information). In order to mitigate the variation and proceed with the pathway, some tasks were undertaken by other available and eligible staff involved in the pathway, resulting in issues of their workload.

Therefore, although a single pathway may be coherent, when it is implemented within a hospital with multiple other incompatible pathways and treatments it can become incoherent. Every additional step that professionals had to take, no matter how small it seemed, added to the complexity of completing their tasks (Tucker, 2004) and consequently, to their overall workload - preventing them from concentrating on their tasks.

Conflicting Key Performance Indicators (KPIs)

Misalignment of the pathway targets with the other pre-existing portfolio targets and goals, induces 'quasi-competition' of the pathway with other hospital treatments and pathways for the necessary resources. The hospital attempted to achieve numerous impractical targets, which caused perverse behaviours, driving professionals to concentrate their efforts on achieving specific statistical targets rather than patient satisfaction associated with high quality of care*: "it is all about statistical things. We have so many KPIs that we are trying to manage and all these are conflicting…" (SR1)*. Centrally, distinct targets shifted the emphasis from local delivery of care to adherence to national standards resulting in the delivery of lower quality of care (Grove et al., 2010). Since the professionals have high levels of autonomy, misalignment of their objectives and professional interests caused the development of an informal prioritisation system.

Another observed indicator of the influence that conflicting targets (administered from governmental/institutional standards) and subsequent interests of each professional group had on pathway implementation was the pathway performance (mis)measurement system, being essential to monitor progress in every OM initiative (Grove et al., 2010). Individuals focused on meeting their departmental targets and practiced different pathway evaluations resulting in faulty evaluation of the pathway and subsequently, inhibiting pathway improvement. Thus, although governmental and institutional bodies set stroke pathway management and clinical targets based on national evidence regarding optimal care, they do so without cognisance of how these need to be adjusted in order to integrate with existing hospital portfolios (Grove et al., 2010). Professionals consequently dispute the validity of these KPIs, underestimates pathway implementation.

Conclusions

The research reported in this paper set out to explore a typical OM theme, the adoption process of an OM initiative aiming at standardising work, in a complex and knowledge intensive setting. Conclusions with practical and theoretical implications emerged in two principal areas.

Firstly, the work confirmed that stroke care pathway is clearly a flow dependency, indicating which tasks should be performed in which sequence and recognising that subsequent tasks and patient outcomes are reliant on the output and timing of the previous ones. But a series of observations indicated that the pathway simultaneously exhibits additional dependencies. Stroke care pathway is also a sharing resource dependency. Once deployed (or once it moved from *in vitro* to *in vivo*) the care pathway no longer existed in isolation and was confronted with the need to interact with a range of other activities and indeed other care pathways. Although OM researchers have highlighted the negative impact of variability in care, this study shows that attempts to blindly implement standardised work can also create capacity issues. Fragmentation of capacity creates continuous interruptions in the process and causes a negative effect both on its effectiveness (i.e. accuracy in decision making) and efficiency (i.e. timeliness and use of resources). The study also highlights the political dimension of resourcing – a contextual variable more evident in the routines literature than the HOM field. There is a direct connection between pathway adoption, professional responsibilities/judgements, resource competition, and consequently political dynamics. This is a potentially unstable dynamic system that is underexplored in the HOM literature.

Moreover, the pathway is a fit dependency (Figure 2). Extending the discussion of shared resources to the broader question of how a hospital reconciles – or fits – all its different care pathways (explicit and implicit, formal and informal) together in a coherent way. The study confirms that such fit dependency issues were not considered in the pathway design, manifested in part in a wide range of conflicting performance objectives. The critical managerial challenge in a fit dependency is to integrate these different 'products' into a coherent package of care and administrative services, but because healthcare necessarily combines the outputs from many different autonomous professionals this limits traditional hierarchical/managerial influence. Individual care professionals create variation in the care tasks and make decisions regarding which type of care is needed or is the priority, or how to practice performance measurement. Therefore, pathway design is a multi-dimensional puzzle and other than flow dependencies should be considered to support its successful adoption.

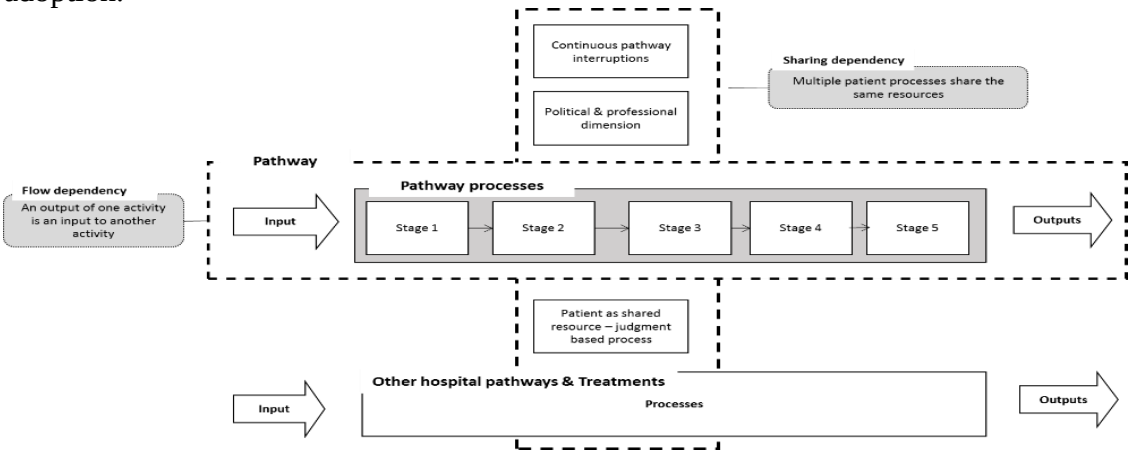

Figure 2: Beyond a simple flow dependency logic

Secondly, this study highlights how a pathway artefact is a zone of two types of autonomy: that of the modeller who designs it and the professionals who use it. Even if artefacts are designed by the hospital managers to coordinate flow and standardise professional work, these are only one aspect of the design process. The artefacts are then used by autonomous professionals who design and redesign the process differently every time they follow it. Professionals do not learn only from flow charts, but they study, see, apply and learn from each other. To improve the development of more authentic and pertinent artefacts we suggest that hospital managers and professionals should promote the

co-design of artefacts with frontline healthcare professionals. Artefacts can be viewed as a type of formal contract between the modellers (hospital managers) and the professionals who use it. Such collaboration between the professionals and management could support operational performance in multiple directions.

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