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Designing markets for co-production of digital culture goods ☆

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ABSTRACT

Digital culture products are easily reproduced, easily distributed, and subject to boundless modification, extension and recombination. This sets the stage for the emergence of markets for co-production of cultural content. This paper studies two new market structures using two different licensing arrangements. First, we consider a consumer market that offers products with content access and content transmutation rights allowing consumers to co-create content products. Second, we consider a sourcing market where producers can trade content access and transmutation rights and thus license content for reuse in production processes. We present experimental findings that show that under both proposed licensing arrangements total surplus is larger than in the baseline case without tradable transmutation rights. The presence of transmutation rights diffuses monopoly power without hurting producers' profits. Our findings also suggest that transmutation-based co-production models can serve as an efficient mechanism for producing for the long tail in cultural content goods segments. In addition to our empirical findings, the paper also contributes a basic experimental framework and market design model that can be readily applied for testing other content licensing arrangements.

1. Introduction

The content industry in culture and entertainment represents a significant business sector that produced about 7% of the U.S. GDP and exported roughly $80b worth of products (in 1999) [42]. Our aim in this paper is to develop and apply the concept of *transmutability*, a very particular issue at the intersection of technology, economics, and business strategy that, we argue, will play an important role in future production models in the digital content industry.

Transmutability, that is, the technical capability to easily manipulate and modify content products that are encoded as digital data [18], enables producers to more easily and more effectively adopt production models that facilitate the collaboration with other producers or with consumers (users) when creating new content products. For the purpose of this paper, in the context of producing cultural content, co-production (or co-creation) refers specifically to the *reuse* and *recombination* of previously recorded content components. Hence, co-production markets make licenses available so that others (producers or consumers) can access copyrighted content for reuse in different contexts and for different purposes. We call these extended rights *transmutation rights*. A specific licensing arrangement should define who, when, what, and how a piece of content may be transmuted in the process of creating new content. The agreement also determines whether or not a reuse fee will be charged to the licensee. We will argue in this paper that taking advantage of the inherent transmutability of digital content, digital culture businesses can strategically adopt more open and more collaborative production models and thereby co-produce content with both producers and consumers in order to increase production flexibility and product variety, to support content customization and personalization, to lower production cost, or to enhance customer experience.

Digital culture products – songs, movies, games, multimedia content etc. – are easily reproduced, easily distributed, and subject to endless transmutation, extension and recombination [22]. Once content is represented as digital data, those bits can be copied, changed, and recombined to produce new, derivative works in the form of digital remixes or mashups. In general, the entertainment industry has traditionally been rather protective of its content products. Recently, however, some companies in the digital content space are beginning to recognize that permitting more open access to the digital content they own may mean some loss of control, but at the same time can also drive value by leveraging user-generated creativity and peer innovation [3,4,28,42].

Transmutability of digital content arises from its representation as binary data, and thereby, it enables effective content sharing and reuse for open culture production of new content. According to Hughes and

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Lang [18], digital remix of culture products involves three essential activities:

- *Sampling*: the acquisition of content components from previously made digital works (input).
- *Manipulation*: the alteration, rearrangement or extension of digital content (transmutation).
- *Release*: recording the new, derivative work for personal use or public release (output).

In other words, a digital remix product uses finished culture works such as music and movies as a source for parts and raw materials that are recombined according to the creative choices of the remix engineer. In a typical creative process the artist will combine various content components to create a digital mix that presents a new, co-created product:

$$\text{new product} = f(\text{component}_1, \text{component}_2, \ldots, \text{component}_n)$$

The components may be sounds, images, or some other media content. Individual components themselves may consist of either newly created original content or samples taken from existing works. Samples are often digitally manipulated before they get added to the new product mix. Sampled components may be copyright protected or in the public domain. Access to the sources of copyrighted content materials does require permission from the copyright holders and may involve considerable effort in terms of identifying the copyright owners and negotiating license agreements and fees. Nonetheless, modern digital media technology does enable powerful digital reuse and rework effects in the production of new content and has been increasingly used by artistic creators, and more recently also by consumers, whether legally or not [2,28]. *The Cabinet of Dr .Caligari (1920)*, the German silent film classic directed by Robert Wiene, presents an illustrative example beyond the more obvious music domain [16]. In 2005, David Lee Fisher digitally scanned the original film and mixed its famously expressionist background sets with newly shot speaking live actors who replaced the original silent acting, and thus created his own version, *The Cabinet of Dr. Caligari (Remix)*. However, if the silent movie had not been in the public domain already (because of copyright expiration) when the remix project was done, it would have been much more difficult for Mr. Fisher to get the access and reuse rights to the original content source that he needed to produce the new work.

The main goal of this paper is to examine how the introduction of specifically designed transmutation rights affects markets for content production. With that in mind, we present an original electronic market design and an exploratory experimental study that compares how two particular content licensing schemes impact market performance in terms of surplus and service levels. More specifically, we address the following three questions in our research.

1. Can we design markets that provide incentives to monopolies for sharing content with other producers?
2. What are the specific welfare effects of opening content (a) to third-party producers, and (b) to consumers?
3. Which of the two types of transmutation rights (producer-based or consumer-based) is economically more efficient?

Based on our experimental research we present three key findings. (1) Some profit-maximizing content monopolists will open access to their products in exchange for higher consumer prices or the ability to collect reuse license fees. (2) The adoption of specifically designed markets for trading content transmutation rights increases producer and consumer surplus. In other words, under the right market structure, open licensing arrangements outperform closed licensing arrangements, and both producers and consumers are better off. (3) While both producer-based and consumer-based transmutation rights create value, our experiments did not indicate whether one is economically more efficient than the other.

2. Related literature

The principles of recombination and reuse are well established in the design sciences and in areas like architecture, engineering, software development, and manufacturing [6,14,15,20]. In the area of cultural content production, however, the idea of sharing and reusing content in order to increase productive or consumptive efficiency has received much less attention [18,28,42]. The present research draws on two disjoint streams of literature. The first concerns research on digital products and the other relates some relevant issues from economic theory.

2.1. Digital products

Because digital culture products are a special case of digital products (or information goods), they take on all the qualities that have been recognized as characteristics of digital products, generally. These include high fixed costs of developing the first copy, low (or zero) cost of reproduction and distribution, indestructibility, non-rivalry and non-excludability [23,29,30]. But research in information economics to date has not much addressed the economic potential of transmutability. Choi et al [11] do discuss transmutability, but they do so mostly in terms of business risks, arguing that firms may lose control of their product after it is released commercially. Using the software industry as their main case in point, they argue that firms often take advantage of transmutability by quickly introducing new product releases in order to degrade the value of older versions and thereby regaining control over their content.

Current experimentation with digital culture products in the marketplace suggests that not only the risks of transmutability need to be considered, but also its considerable potential benefits [42]. In Japan, for example, copyright holders of graphic novels, a highly popular genre known as *manga* with a multibillion-dollar market, allow other commercial producers to appropriate their creations for the purpose of creating new derivative stories [28]. These *doujinshi*, as they are called, freely borrow and extend the original characters and storylines in both stylistic form and plot development. Manga is thus creating profits for the content borrower while also increasing the value of and demand for the original source product. In the context of the video game industry, Arakji and Lang analyze *modding*, a new form of producer–consumer collaboration that is based on user participation in creating new game variants [3]. They find, under certain complementarity conditions, that granting transmutation rights to gamers can increase quality and variety of game offerings.

2.2. Economic theory

From an economics point of view, there are two particular areas that are specifically relevant to the issue of digital remix and co-production. First, modern economic growth theory considers the recombination of knowledge components as an important factor for growth and development. Second, the economics of intellectual property rights analyzes the impacts of regulation that also affect transmutation activities. Economics research generally theorizes about knowledge in very abstract terms. For the purpose of this paper, we conceptualize cultural content as a specific form of knowledge. Applying relevant findings from growth theory, content components, a central concept in our research, are thus reconfigured and recombined in the process of producing new content just like knowledge components and ideas are recombined in the creation of new knowledge.